PREADJUNCT QUESTIONS AS A LEARNING STRATEGY FOR OLDER ADULTS

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Submitted in partial fulfillment

of the requirements for the degree of

Master of Education

Faculty of Education

Brock University

St. Catharines, Ontario

June, 1993

ABSTRACT

This study investigated the effectiveness of comprehension level preadjunct questions as a learning strategy for older adults in a classroom setting. Fifty-five adults from 55 to 70 years of age were randomly assigned to two groups, the preadjunct question group and a no-question control group. They viewed a video on high blood pressure and completed a recall posttest immediately after viewing the video and again seven days later. Results demonstrated that there was no significant difference between groups. However, the no-question control group obtained a higher mean score on both the immediate and delayed recall tests than did the preadjunct question group. Nevertheless, significant differences in posttest scores were found related to educational levels and prior knowledge about high blood pressure. Results obtained were explained in terms of resource theory of cognitive aging.

ACKNOWLEDGEMENTS

I would like to thank the instructors at the Faculty of Education of Brock University for all the interesting and stimulating courses that I have attended over the last three years. It was a special pleasure to be a part of small classes which did not emphasize note taking and exam passing, and instead provided an opportunity for lots of thought-provoking discussion. In addition, I would like to thank the people who were responsible for "hiring 'Bert'" and making it easy to register for courses. In the beginning "Bert" was really frustrating because he was unwilling to be reasonable or negotiate with me. However, as I became more expert in dealing with him, we developed a very good rapport. As well, I greatly appreciated the opportunity to take courses offsite. Being able to attend classes close to home made completing this degree possible. Thanks to the administrative staff for providing these services.

I would like to give special thanks to Dr. Patricia Cranton, my thesis advisor, who has always been available to talk with me when I needed advice, even during evenings and weekends. Her advice (especially on analyzing my data), support and encouragement have been invaluable.

I would also like to thank Dr. Vera Woloshyn and Dr. Alan Wheeler who both sat on my thesis committee. Vera's knowledge of cognitive psychology was a great resource in helping me to explore the theoretical framework underlying my research. Al's support and encouragement,

especially while I was writing my research proposal, was the incentive I needed to undertake a thesis.

I would also like to thank Mr. Mel MacLeod, Superintendent of Program, and Ms. Diane Salter, Supervisor of Day Classes, at the Etobicoke Board of Education. They were especially helpful in paving the way for me to collect my data. As well, I want to thank the teachers at Humber Heights Centre and The Etobicoke School of the Arts. They welcomed me into their classrooms when I was looking for participants and promoted my research with their students. Without their active support, I would not have obtained so many people willing to take part in the study.

Special thanks goes to all the participants of my study who were taking courses at Humber Heights Centre and The Etobicoke School of the Arts, in the Daytime Program for Seniors. They made the data collection lots of fun. We learned a lot from each other. They set fine examples on how to lead an active and productive life after retirement and are exemplary evidence that learning is lifelong.

Lastly, I would like to thank my family; Karen, who has just finished her PhD and Blake, who is just beginning his. Both understand well the pleasures and pains of graduate study, and hence, have been willing sounding boards and unfailing in their love and encouragement. A very special thanks goes to my husband, Edward. He has been a constant source of love and support ever since I returned to university, and I thank him wholeheartedly for it.

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CHAPTER ONE: THE PROBLEM

Introduction

Older people often complain that their memories are not as good as they used to be. Several studies have shown that older adults perform more poorly on memory tests than do younger adults (Craik & Masani, 1967; Craik, Morris, & Gick, 1989; Eysenck, 1974; Salthouse, 1988). However, when given explicit strategies to help them learn to-be-remembered material, older adults showed more improvement than did younger adults on recall tests (Hulicka & Grossman, 1967; Hultsch, 1971; Ratner, Padgett, & Bushey, 1988; Rissenberg & Glanzer, 1986; Treat & Reese, 1976; Wood & Pratt, 1987). One strategy that has been shown to improve recall is preadjunct questions. These are questions that are placed at the beginning of the to-be-learned material to guide what is learned from the instruction. To examine whether or not preadjunct questions might be a useful teaching strategy for use with older adults in educational settings, older adults were given preadjunct questions to answer prior to watching a video on high blood pressure. Participants answered questions based on information in the video immediately after viewing the video and again, seven days later.

Statement of the Problem

Studies involving adjunct questions have typically involved college students. Whether or not preadjunct questions would aid the recall of older adults has not been investigated. As well, these studies have taken place in

the laboratory setting under strict experimental controls. Thus, their ecological validity is limited. In order to discover whether or not preadjunct questions are truly effective in aiding older adults in learning and recalling information, it is necessary to conduct a study in a classroom setting, simulating the natural learning environment as closely as possible.

The Purpose of the Study

The purpose of this study was to evaluate how useful comprehension preadjunct questions were in helping older adults learn information from a videotape lesson. The study was designed to simulate the natural learning environment. Based on the research findings of studies involving college students, it was predicted that older adults who received comprehension preadjunct questions prior to viewing a videotape would perform significantly better on a criterion test administered immediately after viewing the video and again seven days later, as compared to a group of older adults who did not receive the preadjunct questions.

Rationale

Focusing on teaching strategies that may help older adults to learn is especially important because the world population and labour force are aging (Johnston, 1991). Consequently, an increasing number of older adults may likely be in the workforce. In addition, new technologies introduced

into the workplace will require additional training and development. Thus, educators are likely to find an increasing number of older adults attending courses and workshops.

In addition to an increasing number of older adults requiring training and development in the workplace, medical technology has increased the life span resulting in a whole new leisure class which is free to attend educational programs (Gold, 1982). As a result, educational institutions and recreational organizations have developed programs for older adults.

In addition to educational programs being required for this new leisure class, there is also an increased need for educational programs for older adults with medical problems. As adults become older, they tend to have more medical problems than do younger adults and consequently seek medical attention more often. Because the current trend in health care is toward more outpatient services, the need for educational programs is more acute. For instance, if people spend less time in hospital under the observation and care of health care professionals, they must be more informed about their care and treatment, as well as how to maintain a healthy life style, so that they can care for themselves more independently at home. Because older adults tend to have more medical problems, they are more likely to be found in such educational programs. Thus, hospital educators who may be teaching older adults need to know what teaching strategies work best with older adults.

A increasingly popular method for both patient teaching and staff development is the use of videotape lessons. If learning is enhanced by preadjunct questions studied prior to viewing a videotape lesson, this strategy may to be especially helpful for older adults. Thus, investigating the effectiveness of preadjunct questions related to a videotape lesson on the learning and memory performance of older adults is a worthwhile research topic.

Implications of the Study

The results of this research may be very significant for educators who work with older adults. As the number of older adults grows in the general population, it is quite likely that they will seek educational opportunities in increasing numbers. Those people who are retired may be seeking interest courses, while others who are continuing to work may be seeking retraining to keep up with advancing technology. For instance, the Etobicoke Board of Education has 3000 people enrolled in their daytime programs for seniors, 62% of whom are over 64 years of age (MacLeod, personal communication, September 23, 1991). In addition, because of an increasing emphasis on health promotion and outpatient services which require people to be more informed about their health, more older adults may seek health educational programs. If preadjunct questions can be shown to be a significant aid in

helping older adults learn and remember, they may be a powerful teaching strategy for use with older adults.

Definition of Terms

Advance organizer: Introductory information that acts as a bridge from the learner's previous knowledge to the material to be learned. It is supposed to be more abstract and inclusive than the more specific material to be learned, and to provide a means of organizing the new material.

Application Prequestion: A higher order preadjunct question that requires participants to demonstrate application of concepts in order to correctly answer criterion test questions.

Comprehension Prequestion: A higher order preadjunct question that requires participants to demonstrate understanding of concepts in order to correctly answer criterion test questions.

Conceptual Prequestion: Adjunct question that requires the participant to abstract a concept from a sentence or memory of a sentence.

Factual Prequestion: A question that asks the learner to repeat or recognize some information exactly as it was presented in instruction.

Higher Order Prequestion: A question that asks the learner to mentally manipulate bits of information previously learned to create an answer, or to support an answer with logically reasoned evidence.

Incidental Learning: Learning that occurs as demonstrated on criterion test questions that are unrelated to the adjunct questions.

Intentional learning: Learning that occurs as demonstrated on criterion test questions that are directly related to the adjunct questions.

Low order Preadjunct Question: Synonym for factual prequestion.

Massed Preadjunct Question: All questions occur at the beginning of the to-be-learned material.

New question: Test question not encountered previously by the participant as an adjunct question.

Preadjunct question: A question placed before the material to be learned in order to increase the likelihood that learners will correctly answer criterion test questions.

Prequestion: Synonym for preadjunct question.

Postadjunct Question: Question inserted at the end of the to-be-learned material.

Related question: Test question that is related in some way to adjunct questions, where the learning activities necessary to answer the adjunct questions can reasonably be expected to positively influence the learning of information necessary to answer the question.

Repeated question: Test question encountered previously by the participant as an adjunct question.

Unrelated question: Test question that is not related to the information in the adjunct question.

Verbatim Preadjunct Question: Synonym for factual prequestion.

Assumptions and Limitations

The population selected for this study consisted of adults from 55 - 70 years of age who attended classes offered through the Daytime Program for Seniors of a local Board of Education. Because these people were participating in educational programs, it was assumed that they were active, independent and interested in life long learning. It was also assumed, because of their active involvement in educational programs, that these older adults were reasonably healthy, and thus did not have any major physical impediments to learning. To ensure that people with serious vision or hearing problems did not participate in the study, people were asked to exclude themselves from the study if they thought that they had any serious vision or hearing problems that might interfere with their ability to see or hear the video.

A further assumption made was that older adults attending educational programs would differ in terms of knowledge, skills and experience. To ensure internal validity, participants who volunteered for the study were randomly assigned to the experimental and control groups.

In order to obtain a sample of this population, a presentation about the study was made to students in all the classes held at two schools within the Board of Education. People within the desired age range were invited to participate in the study. Since participation was completely voluntary, those people who did agree to participate may not be a representative sample of the population. Consequently, the results of the study may be generalized only to those people who resemble the participants in the study.

Overview of the Remainder of the Document

The remainder of the study is reported in the following chapters. Chapter Two reviews the literature as it relates to age-related changes in memory performance, advance organizers and preadjunct questions. Chapter Three describes the method, including the sample selection, research design, instruments, procedure, and data collection, scoring and analysis. Chapter Four presents the findings of the analysis. Chapter Five includes the discussion, implications and recommendations of the study.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

Age-related Differences in Memory Performance

Some differences in the memory performance of older adults have been attributed to changes that occur in the central nervous system with increasing age. These changes may reduce processing resources (Whitbourne & Weinstock, 1986). Craik and Tulving (1975) state that the depth to which information is processed determines how well it is remembered. Processing of superficial, physical features results in shallow encoding, whereas processing of the meaning of the information leads to deep encoding. As well as depth of processing, elaboration of processing is also important for encoding, such that the richer the associations made, the better the information will be remembered (Craik & Simon, 1980). Depth and elaboration of encoding will lead to a distinctive memory trace, one which is discernible from other memory traces (Craik & Simon, 1980). For successful retrieval of information from memory, retrieval information must also be processed deeply and elaborately (Craik & Simon, 1980). Older people fail to process information as deeply and elaborately, during both encoding and retrieval, as do younger people, and thus demonstrate poorer memory performance (Craik & Simon,1980). In addition, Salthouse (1980) has suggested that as a task requires more effort for completion, it requires more processing time as well as capacity. Consequently, older people are disadvantaged when they encounter effortful tasks. Because of the slowing

that occurs with age in the rate at which the central nervous system can process information, older people require more time to learn an effortful task than do younger people. Nevertheless, when given specific instructions in how to process to-be-remembered material, older people can generate the cognitive operations necessary for good memory performance, although they do not use them spontaneously (Hulicka & Grossman, 1967; Hultsch, 1971; Ratner, Padgett, & Bushey, 1988; Rissenberg & Glanzer, 1986; Treat & Reese, 1976; Wood & Pratt, 1987). For example, older adults demonstrated better memory performance in recalling the steps in making modelling clay after watching a video that emphasized instructions to recall and the importance of reporting small details (Ratner, Padgett, & Bushey, 1988).

Training as well as specific instructions in how to process to-be-remembered material has been shown to improve the memory performance of older adults. For instance, Schaie and Willis (1986) have demonstrated that training in the effective use of cognitive strategies in solving problems related to spacial orientation and inductive reasoning could reverse a reliably documented decline over a 14-year period in a substantial number of older adults. As well, training in mnemonics improved recall for names and faces (Yesavage, 1989) and sayings (Wood & Pratt, 1987) for older adults. The above findings suggest that teaching strategies which aid in organizing the to-be-remembered material will encourage deeper and more

elaborative processing, facilitating both encoding and retrieval, resulting in better learning for older adults.

Advance Organizers

One teaching strategy considered to maximize organization is the advance organizer. The advance organizer is presented before the to-be-remembered material to aid in its organization and consequently improve recall. It provides learners with a frame of reference to help them anticipate and organize materials. As well, the advance organizer provides a conceptual framework for the categorization, storage and subsequent retrieval of this information from memory. In addition, the advance organizer bridges the gap between new information and the learner's existing knowledge (Harvey & Jahns, 1988). Ausubel (1962) developed the advance organizer based on his theory of meaningful learning, subsumption theory. According to this theory, new information is learned and stored in hierarchical form, with broader and more abstract previously learned concepts subsuming more specific new concepts (Ausubel, 1962).

Although McEneany (1990) and Stone (1983) found support for the efficacy of advance organizers, they proffered serious criticisms of Ausubel's subsumption theory and its predictions on learning. For instance, Stone (1983) carried out a meta-analysis of 29 long-term studies to measure effect sizes of advance organizers and compared her results with predictions based

on Ausubel's model. Stone (1983) concluded that advance organizers do facilitate long-term learning. However, her results did not confirm the predictions made by Ausubel's model of learning. For instance, she found that advance organizers which were concrete and non-subsuming were more effective than those that were abstract and subsuming. She recommended that Ausubel's model be modified.

In an effort to explain why support for the efficacy of advance organizers varies, McEneany (1990) reviewed only those studies in which Ausubel, himself, was an author. He reasoned that Ausubel's own empirical studies would be consistent with his subsumption theory. McEneany (1990) pointed out a number of methodological problems, including an inadequate definition of advance organizers and discriminality (the degree to which recently acquired information can be identified as distinct from more inclusive and more finely established concepts), as well as inadequate control for gender, field of study, and the contribution of the advance organizer itself to learning. In addition, McEneany (1990) criticized Ausubel's reliance on correlational arguments to make causal inferences. McEneany (1990) concluded that a number of concepts and predictions central to subsumption theory were not supported by the findings reported in Ausubel's studies.

As alternates to subsumption theory, schema and levels of processing theories offer compatible and simpler explanations for the efficacy of

advance organizers. Schema theory proposes that new information is learned and retained to the extent that it can be related to existing cognitive structures. Thus, material that is unfamiliar or organized in an unfamiliar way will be poorly learned unless learners are given or develop concepts or organizing principles which aid in acquisition. Advance organizers provide such a conceptual or organizing framework (Clark & Bean, 1982). From the levels of processing perspective, an advance organizer which draws the learner's attention to information embedded in the to-be-learned material and provides the learner with an organizing framework, will elicit deeper and more elaborative cognitive processing, facilitating both encoding and retrieval, and consequently will enhance learning.

In summary, advance organizers do facilitate learning as demonstrated by Stone (1983). However, advance organizers must be carefully designed to maximize learning. In addition, both levels of processing and schema theories provide simpler theoretical explanations for these effects than does subsumption theory.

Preadjunct Questions

One type of advance organizer is preadjunct questions. These are questions that are presented immediately before the to-be-learned material to guide what is learned from the instruction. Preadjunct questions focus

on the main themes of the learning material. By doing so, they activate the learner's relevant prior knowledge about the learning material, preparing the learner to assimilate the new information (Hamilton, 1985). As well, preadjunct questions, by drawing the learner's attention to the main concepts of the learning material, suggest an organizing framework for processing new material (Rowe, 1986).

Preadjunct questions fall into two categories based on the level of processing they are thought to induce (Hamaker, 1986). Lower order, or factual/verbatim questions, ask the learner to repeat or recognize information as it appears in the instruction. In order to answer these questions, only the surface structure of the text needs to be remembered (Hamilton, 1985). On the other hand, higher order questions, such as comprehension, inference, or application questions, ask the learner to mentally manipulate information (Hamaker, 1986). To respond to these questions, deeper processing of the semantic information is required (Hamilton, 1985). In summary, preadjunct questions precede the material to which they are related and are meant to focus the learner's attention on the important aspects of the to-be-learned material. They are defined as factual or high level depending on the cognitive processing that they are thought to induce.

Lower Order Preadjunct Questions

Early studies focused on the effectiveness of verbatim preadjunct questions as compared to verbatim postadjunct questions on verbatim recall of prose material. Results indicated that verbatim postadjunct questions facilitated learning for both intentional (directly related) and incidental (unrelated) ideas, whereas verbatim preadjunct questions facilitated learning for intentional ideas only (Frase, 1967; Peeck, 1970; Rickards, 1976b; Rothkopf, 1966; Rothkopf & Bisbicos, 1967; Sagaria & DiVesta, 1978). These results were interpreted in terms of selective attention (Rowe, 1986). Prequestions induced learners to scan the text for relevant material, while postquestions, because they were not initially available, required learners to carefully read the text. Further support for the selective attention hypothesis was provided by Rothkopf and Billington (1979) who studied participants' eye movements during reading when learning goals were memorized. They found that participants searched the text rapidly until they found a goal-related sentence, at which point their eye movements slowed down. The results of the above studies seemed to indicate that postadjunct questions were superior to preadjunct ones for the learning of prose material. However, in a meta-analysis of published adjunct question studies, Hamaker (1986) found that the effect sizes for adjunct questions in studies published after 1975 were not as large as those studies published before 1975. As well, he indicated that there was an

absence of effect on unrelated test questions for postquestions. These results moderated early findings and have lent support to the efficacy of preadjunct questions as a teaching strategy.

Higher Order Preadjunct Questions

Because verbatim prequestions require only superficial cognitive processing, the validity of generalizing their effects to the educational setting was questionable (Watts & Anderson, 1971). Watts and Anderson (1971) argued that the intent of testing was to recall the meaning of prose material, not its surface structure. Consequently, subsequent studies focused on the effects of higher order preadjunct questions on recall.

Several studies have demonstrated that meaningful preadjunct questions promote learning of prose material (Adejumo, 1980; Shavelson, Berliner, Ravitch, & Loeding, 1974; Wilhite, 1983). For instance, Rickards (1976a) compared the effects of higher order and verbatim adjunct questions on immediate and delayed free recall. Conceptual or verbatim questions were placed before or after the associated text segments. On measures of incidental learning, results were similar to earlier studies using verbatim adjunct questions. However, for intentional learning, Rickards (1976a) found that conceptual prequestions produced significantly higher recall than conceptual postquestions or verbatim adjunct questions. Moreover, only conceptual prequestions yielded higher delayed recall than the irrelevant

question control. In addition, Hamaker (1986), in comparing the effect sizes of higher order and factual adjunct questions, found that high order prequestions were superior on repeated, related and unrelated high order test questions than factual prequestions. Thus, meaningful prequestions do facilitate learning and recall. It appears that by drawing the learner's attention to the main ideas in the prose material, prequestions encourage deep and meaningful cognitive processing.

As well as the meaningfulness of prequestions influencing learning and memory, prequestions that are focused on the hierarchical structure of the prose material may also affect what information is remembered. For instance, Wilhite (1983) studied the influence of prepassage questions designed to quiz information of different structural importance. High level questions were related to the superordinate ideas in the prose material and required an answer referring to a subtopic. On the other hand, low level questions referred to subtopics and required detailed information as answers. Participants were asked to recall as much information as they could about the topic. Wilhite's (1983) results indicated that participants with high level questions recalled more incidental information than did those with low level questions or no questions. As well, participants with low level questions recalled more than participants with no questions only when the superordinate information recalled was from the subtopic cluster of ideas containing the quizzed unit. Wilhite (1983) concluded that

superordinate passage segments helped people recall these and other ideas in the passage, depending on its hierarchical organization. He added that developing questions aimed at subordinate ideas does not allow the person to hierarchically organize all the ideas in the passage, resulting in less recall. Based on this evidence, it seems clear that prepassage questions should be developed to incorporate the main ideas of the to-be-learned material, taking into account the hierarchical structure of the passage. In this way, prequestions may facilitate learning for both intentional and incidental ideas.

In addition to relating prequestions to the main ideas of prose material, the effectiveness of prequestions in helping learners to apply concepts and principles is also important. To be truly worthwhile, prequestions should facilitate the application of concepts and principles so that learners may function effectively in the "real world." Felker and Dapra (1975) found that comprehension questions resulted in higher problem solving than verbatim questions. They explained their results in terms of the difference in response requirements of the criterion tests. The free recall test used to assess problem-solving ability allowed participants to generate their answers, whereas the multiple choice format for verbatim and comprehension criterion questions required forced-choice responses.

Contrary to Felker and Dapra's (1975) findings, Andre, Mueller, Womack, Smid, & Tuttle (1980), in comparing the effects of application and

factual adjunct questions on participants' ability to apply concepts, demonstrated that application adjunct questions did not result in better performance on the application criterion questions. In fact, in two experiments, participants given factual prequestions did significantly better on new application questions than did participants given application adjunct questions. Several alternate accounts of Andre et al.'s findings have been proposed. For instance, Hamilton (1986) suggested that the text materials used in Andre et al.'s (1980) study may not have provided the participants with any new knowledge, resulting in no significant difference between groups. On the other hand, the use of multiple choice format for adjunct and criterion questions may have limited participants' ability to discriminate between answers. Support for this alternative is supplied by Hamaker (1986) who found that short-answer adjunct questions produced larger effect sizes than multiple choice questions. In summary, while Felker and Dapra (1975) concluded that comprehension questions facilitated concept application, Andre et al. (1980) found that application questions did not facilitate later performance on application criterion questions. Whether or not prequestions help learners to later apply concepts and principles needs further investigation.

Limitations of Adjunct Question Studies

Research on adjunct questions has three major limitations. First, very few studies have involved populations other than college students. Thus, it is not clear how prequestions might affect the learning of other groups. For instance, the results of studies in which elementary school children were participants indicated that prequestions may have a different effect on children's learning (Anstey & Freebody, 1987; Darwazeh & Reigeluth, 1982; Perlman, Borger, Gonzalez, & Junker, 1988). For example, Darwazeh and Reigeluth (1982) involved eighth-grade students in a study which examined the effects of the type of adjunct questions (use-a-generality, remember-a-generality, and remember-an-instance) and the position of these questions either before the relevant text passage or after it on the three corresponding performance levels of learning. In the six different treatment groups that were used, they found no significant difference for type or placement of adjunct questions on the total test score or on any of the subtests. As well, Perlman et al. (1988) examined the usefulness of preadjunct questions with standardized multiple choice tests in increasing reading comprehension scores of fourth-grade students. They found that there was a slight trend to indicate that those students who read the questions first outperformed those who did not on literal comprehension items, but the results were not conclusive. On the other hand, Anstey and Freebody (1987) obtained different results when they compared the effects

of a variety of pre-reading exercises on text comprehension for fifth-grade students. They found that prequestions significantly aided performance on questions requiring recall of explicitly stated information, but not for questions requiring the inferential linking of disparate elements of text. Anstey and Freebody's (1987) results may be due to the fact that students were given three one-half hour practice sessions over three days prior to the collection of posttest measures. Perlman et al. (1988) gave students only a 60-minute training session on test-taking strategies prior to testing and Darwazeh and Reigeluth (1982) did not give any training or practice sessions. Thus, for children, it is not clear whether or not preadjunct questions are effective.

In a comprehensive literature search no studies were found that examined the effects of preadjunct questions on the memory performance of older adults. Consequently, given the differences in older adults' learning and memory capacity, the effect of preadjunct questions on their memory performance is unknown. One study was found which investigated the effectiveness of postadjunct questions for older adults. Woods and Bernard (1987) explored the use of conceptual postadjunct questions as an instructional strategy for university students over 60 years of age. Results indicated that people who were given postadjunct questions performed significantly better than the control group on the recall of intentional ideas. It may be possible to infer from these results that preadjunct questions may

also help older adults perform better on later recall tests. However, Woods and Bernard's (1987) results require replication.

In addition to focusing on the college student population, adjunct question studies have almost exclusively used prose material. However, a variety of instructional materials is used in educational settings. For instance, videotapes are an instructional media that is very popular in adult education. When using videotapes, educators often draw attention to the salient concepts in the video. If prequestions are effective in facilitating learning from videotape lessons, then educators might formulate their comments into formal prequestions that might more comprehensively draw attention to the major concepts to be learned in the videotape lesson. Kirschner and Brink (1979) established that knowledge and comprehension prequestions with or without feedback on correctness of answers, were significantly more effective than a no-questions group, and slightly, but not significantly, better than the postquestion group. As well, they found no significant difference on recall between the types of questions. However, Kirschner and Brink (1979) pointed out that video learning is different than learning from prose material. For instance, video learning requires the integration of sensory modalities. As well, it presents the material to be learned at a fixed pace. Thus, learning from a videotape lesson may require more cognitive processing than learning from prose material.

The above conclusions have implications for older adult learners. For instance, older adults generally perform better on memory tests when they can control the pace of their learning (Treat & Reese, 1976). As well, they are at a disadvantage as compared to younger adults when cognitive processing requirements are increased (Craik & Simon, 1980). Consequently, if videotape lessons require more cognitive processing, then prequestions may help older adults overcome such demands.

As well as the exclusive use of prose materials in studies, the ecological validity of research on adjunct questions is questionable. Although using semantic prequestions rather than verbatim adjunct questions more closely resembles testing in classrooms, other aspects of research designs do not correspond to classroom situations. For instance, Duchastel (1983) noted that research participants are not allowed to review the to-be-learned material. This condition is different than in the practical setting where students are free to review their text books and notes. As well, the physical setting for research may differ substantially from that found in a classroom. Its unfamiliarity and strangeness may provoke feelings of discomfort or anxiety, which in turn may affect participants' performance on criterion tests. Consequently, results obtained in a research laboratory may be substantially different from those obtained from tests written in the comfort and familiarity of one's own classroom. Thus, the

requirements of the task itself and the artificial setting are two conditions that may limit the ecological validity of adjunct question studies.

In summary, there are several limitations to adjunct question research. The focus on college students precludes generalizing the results to people of other age groups and abilities. As well, the exclusive use of prose material in the research design does not indicate how effective prequestions might be with other instructional methods. Finally, the ecological validity of research results has been questioned.

Summary

Age-related changes in memory performance of older adults have been attributed to changes that occur in the central nervous system with increasing age. These changes may reduce processing resources (Whitbourne & Weinstock, 1986). Studies indicate that older people fail to process information as deeply and elaborately as younger adults during both encoding and retrieval, and thus demonstrate poorer memory performance (Craik & Simon, 1980). As well, processing information requires more time (Salthouse, 1980). However, when older adults are given specific directions in how to process information, they have demonstrated improved performance on memory tasks (Ratner, Padgett, & Bushey, 1988). Thus, teaching methods which provide older adults with strategies for learning may help to improve their memory performance.

Research indicates that the use of semantic preadjunct questions is an effective teaching strategy for helping college students to focus on the major themes of prose passages and to organize the information in a meaningful way, thus facilitating performance on criterion tests. However, whether or not preadjunct questions will enhance the learning and memory performance of older adults has yet to be determined. It is very likely that they will, as strategies that aid in the organization of to-be-learned material have benefited older adults more so than younger adults (Hulicka & Grossman, 1967; Hultsch, 1971; Ratner, Padgett, & Bushey, 1988; Rissenberg & Glanzer, 1986; Treat & Reese, 1976).

In this study, comprehension preadjunct questions were given to older adults prior to viewing a video. Based on research studies, these questions would help older adults to focus on the main ideas of the video and relate these ideas to their past knowledge and experience. By doing so, older adults should process the information in the video more deeply and elaborately, and thus perform better on later recall tests than older adults who do not receive the prequestions.

CHAPTER THREE: METHODOLOGY AND PROCEDURES

Overview

The purpose of this study was to investigate the effectiveness of comprehension preadjunct questions in aiding older adults to learn and remember information from a videotape lesson while in an educational setting.

The study was conducted in two schools within a local Board of Education which offered daytime programs for seniors. Participants attended their regular schools to take part in the study. The study was called a "workshop" and participants attended the workshop in small groups. There were separate workshops for the experimental and control groups. Participants viewed a video and answered questions afterwards. A description of the design, pilot study, participants, instrumentation, scoring, procedure and data analysis is outlined in the following sections.

Description of Research Methodology

Design

A experimental posttest design was used. The test was completed immediately after viewing the video and again one week later. As part of the informed consent process, participants were told about the posttests, as well as the nature of the experimental and control conditions. The design entailed randomly assigning participants into two groups. People in the

experimental group were given the preadjunct questions, instructed to think about the questions and write down what they thought the answers might be. They were assured that it was alright if they did not know the answers to the questions, since very few people knew much about high blood pressure. Once they completed their answers, they viewed the video. Participants in the control group only watched the video. Immediately after viewing the video both groups answered the recall test. Finally, participants completed a questionnaire concerning demographic data, educational level and occupational history. Participants returned one week later to complete the delayed test.

It was expected that those participants who answered the preadjunct questions would perform significantly better on both the immediate and delayed recall tests than would those participants who did not answer the preadjunct questions.

Pilot Study

An experimental design was conducted with six people who belonged to the Plus 55 Club at a local church. The group met at one of the member's homes. Coffee and muffins were served as people arrived. After introductions were made and people had an opportunity to relax, consent forms were distributed, read, and subsequently signed. Then, half of the group were given the pretest questions to answer. Once completed,

everyone watched the video. After viewing the video, half the group answered five questions based on a case study about "Harry" and the other half answered the five identical questions based on a case study about "Alice." Further details of these case studies may be found in the instrumentation section. (The case studies themselves may be found in Appendices C and D.) After the tests had been completed, everyone was asked to complete a questionnaire that required demographic information.

Finally, after the tests and questionnaire were completed, feedback on the clarity of the instruments was sought. The consent form was understood and required no revisions. However, two questions on the pretest and one question on the questionnaire required clarification. On the pretest, people did not understand what was meant by "risk factors" and "modification of risk factors." Subsequently, the wording was changed to "what things might put a person at risk," and "what might a person do to reduce the chances." As well, on the questionnaire, people did not understand the meaning of "mother tongue." Consequently, "mother tongue" was changed to "language most comfortable using."

Selection of Participants

Convenience sampling was done to select 68 participants from 55 - 70 years of age attending continuing education programs offered by a local Board of Education. Because motivation is an important factor in learning,

only people who were actively engaged in educational activities were desired in the study. Thus, participants were sought from continuing education programs.

The Board of Education offers a Daytime Program for Seniors at two of its schools. Courses are offered at a reduced rate to people over 65 years of age. Several subjects are taught, including topics such as French, Spanish and computer studies, as well as oil painting, water colouring, china painting, quilting, sewing, weaving, knitting, crocheting and wood carving.

Sixty classes at the two schools which housed the daytime programs for seniors were visited to invite people to take part in the study. Approximately 700 people were contacted in this manner. The nature of the study was explained, including the subject of the video, and consent forms were distributed to interested people. (The consent form is included in Appendix A.) Since serious non-corrected vision or hearing deficits might impede learning from a videotape, people were asked in the consent form to judge whether or not any vision or hearing problems that they might have would interfere with their ability to watch or listen to a video, and to take this into account before agreeing to participate in the study. The researcher returned to the classes before they ended and collected completed consent forms. Subsequently, 68 people agreed to participate and were randomly assigned to the experimental and control groups.

Several people who had been randomly assigned were not included in the study. For instance, on telephone follow-up to notify people at what time to come to the school, five people withdrew from the study because they had forgotten previous commitments or had experienced sudden acute illness. Also, two people failed to attend the actual sessions. In addition, demographic data collected after the first session indicated that four people were over 70 years of age, and that two people had language difficulties since English was not their first language. Data collected from these six individuals were excluded from the results. Thus, data were collected and analyzed for 55 people.

In total, 41 women and 14 men participated in the study. The demographic questionnaire revealed an age range of 57 - 70 years of age (mean 64.82) and an educational level range from grade school to post-graduate study (median high school).

Instrumentation

There were six instruments required for the study. These included a video; consent form; preadjunct question pretest; posttest # 1, administered immediately after viewing the video; posttest # 2, administered one week later; and the demographic questionnaire. (The instruments are included in Appendices A through E. The transcript of the audio portion of the video is included in Appendix G.)

The video was titled Say Goodbye to High Blood Pressure, and was produced in 1990 by Xenojenex, an American health care communications company. The video was 45 minutes in length. However, there was a natural break in the content at the 30-minute mark and only this first part was used in the study. This video was chosen because of its topic. High blood pressure is a condition which is more prevalent among older people and for this reason, it was felt that it would be of interest to older adults. As well, information in the video was very concrete and thus could be objectively measured on a test.

The consent form described the nature of the study and its relevance to teaching practice. As well, it conformed to the requirements of the Brock University Sub-Committee on Research with Human Participants. (A copy of the consent form may be found in Appendix A.)

Before developing the tests, it was decided to develop preadjunct questions at the comprehension level and questions in the recall tests at the application level. This decision was made because it supported the aim of educators; that is, to help learners understand new concepts and apply them to new situations. Thus, the aim of comprehension preadjunct questions was to promote understanding of the concepts, while the objective of application questions in the posttests was to foster application of the concepts to new situations.

In order to develop the tests, a transcript of the audio portion of the video was analyzed for main ideas. Interrater reliability was established by having two colleagues independently review the transcript to identify the main ideas. It was agreed that there were five main ideas in the video transcript. Subsequently, five comprehension-level preadjunct questions were developed for the pretest.

Preadjunct questions were developed only for the main ideas to help older adults focus on these ideas. Wilhite (1983) showed that preadjunct questions based on main ideas of a written passage helped participants to recall other ideas as well, whereas preadjunct questions based on subordinate ideas facilitated recall for only those ideas which were lower in structural importance to the subordinate ideas. Thus, it was thought that preadjunct questions based only on the main ideas of the video would be most facilitative for older adults.

In addition to the pretest, two case studies were developed for the posttests. A case study about a man called "Harry" was used for the immediate posttest and a case study about a woman called "Alice" was used for the delayed posttest. Five application level questions based on the main ideas of the video were developed for the posttests. The same questions were used in each posttest; however, they were written to refer to either "Harry" or "Alice." As well, these questions were similar to the pretest questions except that they required application of the information found in

the video to the stories about "Harry" and "Alice." Participants were required to make judgements about Harry and Alice and answer the questions accordingly. Interrater reliability was established by having two colleagues analyze the questions as to whether or not they were comprehension or application level questions. Questions were revised where necessary to improve clarity and reflect the correct level of analysis.

In addition to the pretest and posttests, a questionnaire was developed to collect demographic information, as well as educational and occupational history.

The questionnaire and the tests were pilot-tested by members of the Plus 55 Club, a local church group. Ambiguous questions were clarified.

Scoring

Ideal answers for each question in the pretest and the posttests were developed based on the information outlined in the video transcript. One mark was assigned for each correct statement. True statements about high blood pressure not mentioned in the video were not assigned marks, since they were learned from sources outside of the video. (The marking scheme is included in Appendix F.) Tests were marked for six participants, three from each of the control and experimental groups, by both the researcher and a colleague and the marks assigned compared. A few discrepancies were noted in the marking scheme. What concepts constituted equivalent

answers for a particular question and what marks were to be assigned to these concepts needed to be clarified. For example, the concepts of high cholesterol, being overweight, eating fatty foods were considered to be equivalent, and thus mentioning any one or all of these concepts rated one mark. All ambiguities such as this example were identified and the marking scheme was clarified. Following this, tests for an additional 6 participants were marked by both researcher and colleague, and 100% agreement was achieved in the marking scheme. Subsequently, the researcher marked all tests.

During the process of marking the tests, it was noted that 10 out of 55 participants (five in the experimental group and five in the control group) made correct statements about high blood pressure; however, in answer to the wrong questions. Even though under the wrong question, these statements were accepted as correct and assigned marks for the following reasons. First, the intent of the posttests was to elicit how much information participants had learned about high blood pressure from the video. Participants did demonstrate their knowledge, even though under the wrong question. In addition, the wording of the questions invited long responses. As well, the questions were sequenced in such a way that one question led into the next. Thus, statements that were made under the wrong question flowed naturally from the information that the participants

had previously written. Consequently, their statements were accepted and scored appropriately.

Procedure

The study was scheduled to take place on Mondays and Thursdays at one school, and Tuesdays and Fridays at the other school. Participants at each school were given a choice of the days they preferred to attend when they consented to take part in the study. Consequently, there were four groups of participants.

Then, participants were randomly assigned to the experimental and control groups according to the school which they normally attended for classes, and the day they chose to attend. They were phoned a few days before the date of the study to tell them what time to come, and to inform them that muffins and drinks would be waiting for them on arrival. Control groups met at 0900 hours and experimental groups at 1030 hours. The same structure and format were followed for each group during the sessions.

In order to ensure that participants could talk to each other easily and at the same time have an unobstructed view of the television, the classrooms were set up with oblong tables in a U-shaped format. The classrooms were well-lighted and comfortably warm. The video machine and television were set up at the front of each classroom so that all participants

had an unobstructed view of the television. The television screens were large and the videotape was projected clearly.

Because motivational factors such as anxiety, fear and cautiousness have been shown to contribute to deficits on memory tests (Whitbourne & Weinstock, 1986), particular attention was paid to the classroom set-up and the environment to decrease the influence of such factors. For this reason, people were welcomed on arrival and offered refreshments of coffee, tea, juice and muffins. As well, participants were given name tags to wear. Once everyone had arrived and had obtained refreshments, the researcher introduced herself and asked the participants to introduce themselves and relate what classes they were attending at the school. Once the introductions were completed and participants had a chance to chat with each other, the task was explained and questions answered. Subsequently, the control groups viewed the video and the experimental groups answered the questions on the pretest and then viewed the video. Immediately prior to writing the posttests, participants in both conditions were told to answer the questions as fully as possible, to answer all five questions, and to take whatever time they needed to complete the test. The same instructions were given to the experimental group when they answered the preadjunct questions. In addition, the experimental group was told that it was alright if they could not answer the preadjunct questions since very few people knew much about high blood pressure. As well, they were told that

forgetting is normal, and that they were not to be concerned if they could not remember what they knew about high blood pressure in order to write it down. After completing the posttest, participants were asked to complete the questionnaire. At the end of the session, people were thanked for their time and commitment and were reminded about the date and time of the next session.

Two or three days before the second session, all participants were phoned to remind them of the date and time of the session, and told that muffins and drinks would be waiting for them on arrival.

At the second session, the classrooms were set up in the same fashion as on the first day. People were greeted at the door of the classroom and offered refreshments. When everyone arrived, the task was explained and questions answered. Participants were given the story about Alice and asked to answer the questions based on Alice's story. They were told to answer the questions as fully as they could, to answer all five questions, and to take all the time they required. Once participants had completed the test, the researcher debriefed the group, explaining what she expected to find and answered their questions both about the study itself and about high blood pressure. Pamphlets on high blood pressure produced by the Government of Ontario were available for the participants to take home. Participants were thanked for their time and commitment and were assured that they would receive a short summary of the findings.

During the first session at School B, one experimental group was interrupted by the fire-alarm and required to evacuate the building. The length of interruption was approximately five minutes. As well there were six subsequent intercom messages. In order to ensure that these data did not need to be excluded, the posttest means were compared and no significant differences were found on the immediate posttest $t(26) = -.39$ ns., nor on the delayed posttest $t(24) = .29$ ns. Consequently, these data were included in the data analysis.

Seven people indicated on the demographic questionnaire that they were health care professionals prior to retirement. To ensure that these data did not need to be excluded, the pretest means were compared and no significant difference was found, $t(26) = .63$ ns. Thus, posttest scores for health care professionals were included in the data analysis.

Data Analysis

Results obtained are presented in the form of tables. Means and standard deviations are outlined. A one-way analysis of variance was used to identify differences between the preadjunct question and the control groups on immediate and delayed posttests. Two-sample t tests were used to identify differences in test results as related to gender, education, occupation and place of study. As well, one-way analyses of variance were used to determine significant differences in scores based on age and

education. In addition, a paired t test was used to outline differences between scores on the immediate and delayed posttests.

Summary

It can be inferred from the literature on preadjunct questions that they could be an effective teaching strategy to enhance learning outcomes for older adults. However, no study to date has included older adults as participants. Consequently, this study has been designed to test the hypothesis that preadjunct questions will enhance learning and memory performance for older adults. Moreover, this study has been devised to imitate the natural educational setting, for only by establishing ecological validity can educators really know whether or not preadjunct questions are a practical teaching method that enhances learning, especially for older adults.

CHAPTER FOUR: FINDINGS

The purpose of this study was to assess the effectiveness of preadjunct questions in aiding older adults to learn information from a video on high blood pressure while in a classroom setting. Scores of the preadjunct question group and control group were compared on the immediate and delayed posttests. Descriptive and inferential statistics are presented in the following sections.

Descriptive Statistics

Demographic data for the participants are listed in Table 1. Means and standard deviations for the immediate and delayed recall tests by age, sex, education, occupation and interruption factor are listed in Table 2. Means and standard deviations for the immediate and delayed recall tests by group are listed in Table 3.

As is indicated in Table 1, 41 women and 14 men participated in the study. The mean age of participants was 64.8 years. While educational level of participants ranged from completion of grade school to post-graduate study, 46% of the participants reported that they had completed high school, 25 %, college and 18%, university. Seven of the participants indicated that they had worked as health care professionals prior to retirement.

Table 1

Demographic Data for Participants

				Mean				Standard Deviation				
Age				64.8				3.8				
				Male				Female				
Sex		N			%			N			%	
		14			25%			41			75%	
	Grade		High		College		University		Post			
Education	N	%	N	%	N	%	N	%	N	%		
	5	9%	25	46%	14	25%	10	18%	1	2%		
	Health Care Providers				Non-health Care Providers							
Occupation	N			%			N			%		
	7			13%			48			87%		
				School A				School B				
Place	N			%			N			%		
	31			56%			24			44%		

Table 2 displays descriptive statistics for the immediate and delayed posttests based on demographic information. When comparing mean scores by age, participants aged 60 to 64 years had a higher mean score than either people from 55 to 59 years or those from 65 to 70 years on the immediate posttest. However, this changed on the delayed posttest where the mean score was highest for the 55 to 59 years group. Overall, the two younger groups tended to perform better on both the immediate and delayed recall tests than did the oldest group.

In comparing mean scores by gender, the mean score for men was higher on the immediate posttest than for women, but dropped close to the women's mean on the delayed posttest. Thus, men tended to outperform women on both immediate and delayed recall tests.

A comparison of mean scores by educational level reveals that the mean for university graduates was higher than grade school, college and post-grad means, both on the immediate and delayed posttests. Thus, participants who had completed more schooling tended to perform better on both recall tests than those with less education.

As well, the mean score for people who were in health care professions before retirement was higher on the immediate and delayed posttests than for those people who were not health care professionals. However, on the delayed posttest, the mean score for non-health care

Table 2

Means and Standard Deviations for the Immediate and Delayed Posttests by Age, Sex, Education, Occupation, Place of Study and Interruption Factor

Category	Immediate Posttest		Delayed Posttest		N
	Mean	SD	Mean	SD	
Age					
55-59	16.83	6.55	15.50	5.54	6
60-64	17.40	5.23	15.06	4.77	20
65-70	16.31	4.40	13.32	3.41	29
Sex					
Female	16.24	4.91	14.03	4.08	41
Male	18.29	4.66	14.57	4.65	14
Education					
Grade school	16.00	5.43	14.20	2.95	5
High school	15.20	4.10	13.04	3.80	25
Community College	16.57	5.14	14.08	4.50	14
University	21.00	4.34	16.90	4.75	10
Post-graduate	20.00	.00	15.00	.00	1
Occupation					
Health Care	21.43	6.21	16.71	6.52	7
Non-health Care	16.08	4.34	13.78	3.67	48
Interruption Factor					
Interrupted	15.60	4.56	13.60	1.82	5
Not interrupted	16.88	4.95	14.23	4.38	50
Place of Study					
School A	16.52	4.54	13.19	3.93	31
School B	17.08	5.39	15.62	4.26	24

professionals did not drop as much as compared to the mean score of health care professionals.

Those people at School B who were interrupted by the fire alarm and subsequent intercom messages had a lower mean score on both immediate and delayed posttests than did those who were not interrupted. The mean for people at School B was higher than the mean score for people at School A both on the immediate and delayed posttests.

In general, higher mean scores were obtained by men, those in the younger age groups, university graduates and health care professionals.

Table 3 displays means and standard deviations for the immediate and delayed posttests. It is interesting to note that the control group obtained a higher mean score on both the immediate and delayed posttests than did the preadjunct question group. It was expected that the preadjunct question group would obtain higher mean scores than the control group.

Hypothesis Testing

Older adults from 55 to 70 years of age were given comprehension preadjunct questions to read and attempt to answer prior to viewing a video on high blood pressure. It was predicted that participants who received preadjunct questions would perform significantly better on a criterion test administered immediately after viewing the video and again seven days

Table 3

Means and Standard Deviations for the Immediate and Delayed Posttests by Group

Group	Immediate Posttest		Delayed Posttest	
	Mean	SD	Mean	SD
Preadjunct Question	16.32	4.71	13.31	3.94
Control	17.22	5.11	15.04	4.35

later as compared to a group of older adults who did not receive the preadjunct questions.

A one-way analysis of variance (ANOVA) was performed on the data to identify the effect of preadjunct questions on posttest scores. There was no significant difference in performance between the preadjunct question group and the control group on the immediate posttest $F(1, 53) = .462$ ns. nor on the delayed posttest $F(1, 50) = 2.263$, ns. Means and standard deviations are presented in Table 3. The one-way ANOVA for immediate posttest is presented in Table 4 and for the delayed posttest in Table 5. Thus, these results indicate that preadjunct questions did not aid the participants in answering the posttest questions. The hypothesis was not supported by the results of the study.

Post-hoc Analyses

Independent samples t tests were performed to identify any significant differences between the means of posttest scores based on sex, occupation, place of study and interruption factor. As well, analyses of variance were completed to determine any significant difference in scores based on educational level and age. Then, both independent and paired samples t tests were done to determine whether prior knowledge about high blood pressure had a significant effect on posttest scores. Finally, paired

Table 4

Analysis of Variance for Immediate Posttest by Group

Source of Variance	SS	df	MS	F	p
Group Main Effects	11.15	1	11.15	.462	.50
Residual	1278.77	53	24.13		
Total	1289.93	54	23.89		

Table 5

Analysis of Variance for Delayed Posttest by Group

Source of Variance	SS	df	MS	F	p
Group Main Effects	38.94	1	38.94	2.26	.14
Residual	86.50	50	17.21		
Total	899.44	51	17.64		

samples t tests were performed to detect significant differences between the means of immediate and delayed posttest scores.

Sex, Occupation and Place of Study

Independent t tests revealed no significant difference on the immediate posttest due to sex $t(53) = -1.40$, ns., occupation $t(53) = 2.20$ ns., place of study $t(53) = -.41$, ns., nor on the delayed posttest due to sex $t(50) = -.39$ ns. or occupation $t(50) = 1.16$ ns. However, there was a significant relationship between place of study and the delayed posttest, $t(50) = -2.08$, $p < .05$. People at School B performed significantly better on the delayed posttest than people at School A.

Education

A one-way ANOVA revealed a significant main effect for education for the immediate posttest $F(4, 50) = 3.072$, $p < .05$, but not for the delayed posttest $F(4, 47) = 1.568$, ns. Participants with higher education performed significantly better on the immediate posttest than did others with lower levels of education. However, significant differences between participants disappeared on the delayed posttest. Means and standard deviations are presented in Table 2. The ANOVA for the immediate posttest by education is presented in Table 6 and for the delayed posttest in Table 7.

Table 6

Analysis of Variance for Immediate Posttest by Education

Source of Variance	SS	df	MS	F	p
Education Main Effects	254.50	4	63.63	3.07	.02
Residual	103.43	50	20.71		
Total	1289.93	54	23.89		

Table 7

Analysis of Variance for Delayed Posttest by Education

Source of Variance	SS	df	MS	F	p
Education Main Effects	105.87	4	26.47	1.57	.20
Residual	703.58	47	16.89		
Total	899.44	51	17.64		

Since participants with higher educational levels performed significantly better than those with lower educational levels on the immediate posttest, it is possible that the results reflect a disproportionate number of participants with college or university education in the control group. To determine whether or not a difference in educational levels of participants between groups might have affected the test scores, a cross-tabulation of group by education was performed. Results indicated that 50% of the preadjunct question group had completed either college or university while 37% had done so in the control group. If level of education was responsible for the results, it would be expected that the preadjunct group would attain higher scores. The numbers and percentages of participants based on educational level are listed in Table 8.

Because there was a significant difference between delayed posttest scores between the two places of study, a cross-tabulation of place of study by education was done to explore this difference. Results indicated that 10 participants at School A had completed either college or university, whereas 14 participants at School B had done so. As well, only 24 participants attended School B, while 31 attended School A. However, at the time of the delayed posttest, three participants at School B were unable to attend, one from the experimental group and two from the control group. Consequently, only 21 people at School B completed the delayed test. In addition, test

Table 8

Numbers and Percentages of Participants According to Group and Educational Level

	Education Completion Level									
	Grade		High		College		University		Post	
	N	%	N	%	N	%	N	%	N	%
Preadjunct	1	3.6	12	42.9	10	35.7	4	14.3	1	3.6
Control	4	14.8	13	48.1	4	14.8	6	22.2		

scores for the immediate posttest for these three people were all below the mean. The numbers and percentages are listed in Table 9. It seems likely that the significant finding on the delayed test is due to a disparity in numbers and education between the groups.

Age

Participants' ages were correlated to test scores on both the immediate and delayed posttests. Results indicated a negative correlation between age and test scores on the immediate post test ($r = -.1592$) and on the delayed posttest ($r = -.2854$). Subsequently, the data were categorized by age, 55-59, 60-64, 65-70 and an analysis of variance was performed. Results indicated no significant difference by age on the immediate posttest $F(2,52) = .287$ ns. nor on the delayed posttest $F(2,49) = 1.287$ ns. Results of the analysis of variance by age are presented in Table 10 for the immediate posttest and in Table 11 for the delayed posttest.

Prior Knowledge

To determine whether or not prior knowledge about high blood pressure had any effect on post-test scores, the preadjunct group was divided into two groups by score and an independent samples t test was performed. Those participants who scored above the mean on the pretest

Table 9

Numbers and Percentages of Participants According to Place of Study and Educational Level

	Education Completion Level									
	Grade		High		College		University		Post	
	N	%	N	%	N	%	N	%	N	%
School A	3	9.7	17	54.8	6	19.4	4	12.9	1	3.2
School B	2	8.3	8	33.3	8	33.3	6	25.0	-	

Table 10

Analysis of Variance for Immediate Posttest by Age

Source of Variance	SS	df	MS	F	p
Age Main Effects	14.08	2	7.04	.29	.75
Residual	1275.84	52	24.54		
Total	1289.93	54	23.89		

Table 11

Analysis of Variance for Delayed Posttest by Age

Source of Variance	SS	df	MS	F	p
Age Main Effects	44.89	2	22.45	1.29	.29
Residual	854.55	49	17.44		
Total	899.44	51	17.64		

performed significantly better on the immediate posttest than those who scored below the mean, $t(26) = -2.61$, $p < .05$ on the pretest. Then, a paired samples t test was performed for each group to compare pretest and posttest means. For the group scoring below the mean, there was a significant difference between pretest and immediate posttest scores, $t(13) = -7.01$, $p < .001$ and also delayed posttest scores, $t(13) = -6.11$. $p < .001$. For the group scoring above the mean, there was also a significant difference between pretest and immediate posttest scores, $t(8) = -4.08$, $p < .05$ and also delayed posttest scores $t(7) = -2.31$, $p < .05$. As well, a moderate negative correlation between pretest and immediate posttest scores was found for the group scoring below the mean on the pretest ($r = -.472$), whereas no such correlation was found for the group scoring above the mean on the pretest, ($r = .063$). However, the strength of the relationship between pretest and posttest for the group scoring below the mean did not hold for the delayed posttest ($r = -.234$). Thus, people with less prior knowledge about high blood pressure tended to demonstrate a larger gain in their scores on the immediate posttest than did people with more prior knowledge, but not so on the delayed posttest.

Retention of Information

To determine whether or not there was a significant difference in participants' ability to recall information from the video seven days later,

paired samples t tests were performed on the data. Results demonstrated a significant relationship between immediate posttest and delayed posttest scores $t(51) = 6.56$, $p < .001$. All participants performed significantly better on the immediate posttest than on the delayed posttest. Then, paired samples t tests were conducted on the data for both the preadjunct question group and the control group. For the preadjunct question group, results demonstrated a significant difference between immediate and delayed posttest scores, $t(25) = 5.33$, $p < .001$. Similarly, for the control group, there was a significant difference between immediate and delayed posttest scores, $t(25) = 3.95$, $p < .001$. Thus, both the preadjunct question group and the control group performed significantly better on the immediate posttest than on the delayed posttest.

Summary

The results indicate that there was no significant difference in posttest scores for older adults who received preadjunct questions prior to viewing the video as compared to scores for those older adults who did not receive preadjunct questions. However, results also indicate that there were some significant differences in posttest scores based on education, prior knowledge, place of study and retention of information. Interestingly, though there was a minimal negative correlation between age and test scores, the result was not significant.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND IMPLICATIONS

Discussion of Hypothesis

The purpose of this study was to evaluate the effectiveness of preadjunct questions as a learning strategy for older adults in a classroom setting. It was predicted that older adults who answered preadjunct questions prior to viewing a video on high blood pressure would perform significantly better on later recall tests than would those who did not receive the preadjunct questions. However, a one-way analysis of variance showed that there was no significant difference in performance between the experimental and control groups on either an immediate recall test or a delayed recall test completed seven days later. In fact, the control group obtained a higher mean score on both immediate and delayed recall tests than did the preadjunct question group. Thus, the hypothesis was not supported. Preadjunct questions were not an effective learning strategy for older adults in learning information from a video.

This study differed from typical preadjunct question studies in three important ways. First, the participants were older adults rather than college students. Second, the learning material used was a video rather than written prose text. Third, the study simulated a group-structured educational program and was conducted in a school classroom rather than in a laboratory setting where participants are tested individually under

strictly controlled conditions. Any or all of these factors could have influenced the effectiveness of the preadjunct questions in this study.

One reason why preadjunct questions do not appear to help older adults learn information from a video may be that these questions do not facilitate cognitive processing, and hence learning, to the same extent for older adults as for college students. Previous studies involving college students have demonstrated that meaningful preadjunct questions have promoted learning of prose material (Adejumo, 1980; Shavelson et al., 1974; Wilhite, 1983). These results have led to the conclusion that preadjunct questions help the learner to focus on main themes, thus activating relevant prior knowledge and preparing the learner to assimilate new information (Hamilton, 1985). As well, preadjunct questions were thought to provide the learner with an organizing framework for learning the new information (Rowe, 1986). These activities require the learner to mentally manipulate information, and to do so, deep cognitive processing is required. However, older adults may not be able to generate sufficient processing resources to do this as compared to college students.

Mentally manipulating information is done in working memory. Baddeley (1986) defined working memory as a limited capacity system consisting of representation codes for the temporary storage of information and a central executive capable of attention, selection, and manipulation of information. Tasks that tap working memory necessitate simultaneous

storage of recently presented material and processing of additional information (Hultsch & Dixon, 1990). Craik (1977) was one of the first to demonstrate that tasks tapping working memory showed age-related decrements when they required active manipulation of information or division of attention. Recently, both Craik et al. (1989) and Salthouse (1988) have suggested that the older adult's difficulty lies primarily in the processing aspects of working memory rather than in the storage aspects.

These findings may explain the results of this study. For instance, in the experimental condition, participants were required to think about and answer preadjunct questions, and then watch a video on high blood pressure. This task required processing the preadjunct questions in working memory, as well as using these questions as a learning strategy to process information in the video. If participants did not have sufficient cognitive resources in working memory to complete both of these tasks, it is possible that their cognitive resources were directed to processing the preadjunct questions, to the detriment of processing information in the video. Consequently, insufficient processing of the information in the video was reflected in the experimental group's answers on the recall tests. Thus, the posttest scores of the experimental group did not exhibit the expected facilitative effect of the preadjunct questions.

This explanation is also supported by evidence in studies involving children. If the capacity and resources of working memory are viewed as a

developmental phenomenon related to the maturation of the central nervous system, then performance differences in cognitive processing in working memory will be demonstrated by people in different developmental stages. For instance, both Darwazeh and Reigeluth (1982) and Perlman et al. (1988) found that preadjunct questions made no significant difference on test scores for children in the eight and fourth grades respectively. From these results, it appears that these children did not have sufficient cognitive processes to effectively make use of preadjunct questions for learning new material. Similarly in this study, older adults, at the opposite end of the developmental continuum, were not able to generate sufficient cognitive resources to make effective use of preadjunct questions in learning information from the video when compared to a no-question control group. Thus, the results of this study are quite different from those of studies involving college students.

A second way in which this study differs from other studies involving preadjunct questions is in the use of a video rather than written prose text. In the typical preadjunct question study, the participant is required to study an instructional prose text which includes the preadjunct questions (Hamaker, 1986). Participants are instructed to answer these questions as they meet them in the text. Once participants have finished studying the text, they are asked to complete a criterion test. The time allowed to spend on the task may or may not be controlled. This task differs greatly from

that of watching a video. Consequently, it may be that preadjunct questions do not work in quite the same way for learning information from videos as they do for prose text. However, evidence supplied by Kirschner and Brink (1979) suggests that preadjunct questions should be an effective learning strategy to learn information from a video. He demonstrated that knowledge and comprehension preadjunct questions were significantly more effective than a no-questions group on recall tests for college students. However, Kirschner and Brink (1979) stated that there were two important differences between a prose text and a video. The video requires participants to integrate information from the visual and auditory senses, whereas the text does not. As well, the pace of the video is fixed and beyond the control of participants in the study. Although time may be controlled in a study using prose text, participants still have some control over their own speed of reading. Thus, Kirschner and Brink (1979) suggested that learning information from a video required more cognitive processing than did learning information from prose text. Because preadjunct questions were not an effective learning strategy for older adults in this study, it may well be that the requirement to process information both visually and auditorially from the video along with its fixed pace, in combination with the necessity to process preadjunct questions as a learning strategy may have been beyond the processing capabilities of working memory for older adults.

The final way in which this study differs from typical preadjunct question studies is that it was conducted in a classroom setting. A major concern of preadjunct question studies is that of ecological validity (Duchastel, 1983). Conditions prevailing in laboratory research may differ substantially from that of the classroom. As well, feelings of discomfort or anxiety, which may be provoked by strange surroundings, may affect participants' performance on criterion tests. In this study, every attempt was made to simulate a typical classroom environment. The tables were set up in a U-shaped format as they were in most other classrooms in the school. The study was called a "workshop." People attended the workshop in groups. A welcoming atmosphere was provided by greeting people on arrival and offering refreshments. People had an opportunity to chat over coffee before the workshop commenced. As well, once the workshop started, the researcher introduced herself and shared some of her interests. Then, the participants were invited to do the same. Once participants appeared relaxed and were chatting comfortably, the task was introduced. In this manner, apprehension over the task was kept to a minimum. That it was a positive experience for participants is evident from the fact that 52 of the 55 participants returned for the delayed test. The three people who did not attend the second session had legitimate reasons for not coming, and phoned the researcher to apologize. Based on these facts, it may be assumed that the environment had been a welcoming one, that motivational

and contextual factors that interfere with learning were kept to a minimum, and that the study had been successful in simulating the "real" world of the classroom. Since preadjunct questions were not effective in this study, the question of ecological validity of preadjunct question studies involving college students still needs to be answered.

Even though attempts were made to keep motivational factors that interfere with learning to a minimum, it is possible that participants in the preadjunct group were inhibited from learning information in the video because they were anxious about having to write a test afterwards. Having to answer questions prior to viewing the video may have heightened their awareness about the testing requirement. Consequently, they may not have been able to concentrate on the video as well as they could have otherwise. Recognizing that anxiety is a normal reaction to the thought of taking a test, the word "test" was never mentioned either in conversation or in any of the written materials. Instead, tests were referred to as "questions to be answered." As well, any questions participants had about the tests were answered frankly and honestly as possible. In addition, during the sessions, no behaviours that might indicate anxiety were observed by the researcher. However, even though the participants in the preadjunct group did not appear anxious about the tests, anxiety cannot be ruled out as a contributing factor to the results of the study.

The Influence of Age on Posttest Scores

Since a deficit in processing resources has been identified as a result of cognitive aging (Craik et al., 1989; Craik & Simon, 1980; Salthouse, 1988), test scores were analyzed to determine the effect of participants' ages on posttest scores. If more older-aged people were in the preadjunct question group, and it was found that older-aged people performed more poorly on the recall tests than did younger adults, then this fact might account for the study results. Participants' ages were correlated to test scores on both recall tests. Results indicated a weak negative correlation between age and test scores. Older age was associated with lower scores. The data were subsequently re-categorized into three age groups and a one-way ANOVA was performed which indicated no significant difference between test score means due to age. Therefore, differences in participants' ages does not account for the results.

The Influence of Education on Posttest Scores

To rule out the possibility that the results of the hypothesis testing were due to differences in educational levels between groups, a one-way ANOVA was performed. Results indicated that participants with higher education performed significantly better on the immediate posttest than did those with less education. However, these results did not hold for the delayed posttest where no significant difference was found. To rule out the

possibility that a disproportionate number of participants with higher education might have been in the control group and thus skewed the results, a cross-tabulation of group by education was performed. It indicated that 50% of the preadjunct group had completed either college or university, whereas only 37% had done so in the control group. If level of education were responsible for the results, it would be expected that the preadjunct question group would have obtained higher scores, and this was not the case. Thus, educational level was not responsible for the results. It is interesting to note that no significant difference was found between groups defined by educational level on the delayed recall test. People with higher education may have been more familiar with test-taking strategies as a result of their educational experiences, and hence performed better than people with less education on the immediate recall test. However, at the time of the second recall test, those people with less education may have gained experience with the test questions, and consequently performed similarly to those with higher education.

This explanation is supported by the fact that questions on the immediate and delayed posttests were identical with the exception that the immediate recall test referred to a case study about "Harry" and the delayed test to a case study about "Alice," and thus required answers based on the case studies. Therefore, it is likely that familiarity and experience with the

test questions reduced the difference between people with higher levels of education and those with less education in performance on the delayed test.

Level of education was also related to place of study. Although there was no significant difference in mean scores between participants at School A and School B on the immediate test, people at School B performed significantly better on the delayed recall test than did people at School A. A cross-tabulation of place of study by education revealed that 32% of the participants at School A had completed either college or university, whereas 58% of the participants at School B had done so. However, only 44% of the participants attended School B, while 56% attended School A. In addition, three participants were unable to return for the delayed test at School B, one from the experimental group and two from the control group. When the immediate posttest scores were examined for these people, it was found that the scores were below the mean. It may be assumed that these participants would have scored similarly on the delayed test had they written them. Thus, without their scores on the delayed test, the mean would be higher for the control group at school B than it would have been had missing participants completed the posttest. Therefore, it seems likely that the significant finding on the delayed test is due to the fact that there was a disparity in numbers and education between groups on the delayed test.

The Influence of Prior Knowledge on Posttest Scores

It is conceivable that the results of the study were influenced by prior knowledge about high blood pressure. If people in the control group were more knowledgable about high blood pressure than people in the experimental group, then their scores would be higher than those of the experimental group, and it would appear that preadjunct questions were not an effective learning strategy for the experimental group when they might well have been. However, the research design did not permit this analysis.

Nevertheless, to explore the effect of prior knowledge about high blood pressure on the study results, the preadjunct question group was divided into two groups by score, above and below the mean, and independent and paired t tests were done. Because participants were randomly assigned to the experimental and control groups, it could be assumed that results found from these t tests would apply to the control group as well. Results of the t tests were significant. Those participants who scored above the mean on the pretest performed significantly better on both the immediate and delayed recall tests than did those who scored below the mean on the pretest. However, there was a moderate negative correlation between pretest and posttest scores on the immediate posttest for the group scoring below the mean, but no such relationship was found for the group scoring above the mean. This suggests that people with less prior knowledge about high blood pressure showed a larger gain in their

posttest scores than did people who had scored above the mean on the pretest. As well, it may be interpreted that those participants scoring above the mean on the pretest showed a ceiling effect on the posttest. Thus, those people with prior knowledge about high blood pressure did not learn as much new information as those scoring below the mean, and thus, did not benefit as much from the treatment.

The results of this analysis suggests that participants did learn significantly from the video. Because the participants were randomly assigned to the experimental and control groups, it may be assumed that participants in the control group learned significantly from the video as well. In addition, because of random assignment, prior knowledge may be assumed to not be a significant factor in the results of the hypothesis testing.

Retention of Information

One way to evaluate whether or not learning has taken place is to retest participants' knowledge at a later time. In this study, participants returned seven days later to complete another test. This test took place in the same classroom as the first session, using the same classroom set-up. Once more, participants were welcomed on arrival and offered refreshments. The test was not introduced until people had settled in and were chatting comfortably to each other. A independent sample t test showed that all

participants performed significantly better on the immediate posttest than they did on the delayed posttest. As well, a paired samples t test performed on test scores demonstrated that there was a significant difference in mean scores for both the experimental and control groups on both the immediate and delayed posttests. Thus, it appears that although all participants had retained information from the video, they had forgotten a significant amount of information as well. Interestingly, the mean score of the control group did not drop as much as that of the preadjunct question group on the delayed test. Although there was no significant difference between groups on the delayed test, the control group performed better than the preadjunct question group on the delayed test, and appeared to forget less information. It may be interpreted from these results that the control group had learned more information from the video than did the preadjunct question group. One explanation might be that the control group was able to process the information in the video more deeply and elaborately than the preadjunct question group because it was not hampered by the need to process the preadjunct questions. Consequently, as a result of deeper and more elaborate processing, the control group was able to perform better on a recall test one week later.

Implications for Further Research

The findings of this study suggest several implications for further research. First, the study needs to be replicated with older adults in a similar setting to confirm the findings. Additionally, the effect of training older adults to use preadjunct questions as a learning strategy needs to be investigated. Evidence from preadjunct studies involving children in which they received training in the use of preadjunct questions suggests that older adults might benefit from training as well. To illustrate, Anstey and Freebody (1987) gave fifth-grade students practice sessions in using preadjunct questions before a reading activity. They found that preadjunct questions significantly aided recall of explicitly stated information. This finding suggests that training older adults to use preadjunct questions may facilitate their learning.

Training older adults to use preadjunct questions to facilitate their learning may indeed be effective. Initially, learning a new strategy requires the cognitive processing resources of working memory. However, as the strategy is learned and becomes more familiar, it becomes more automatic as well, and thus requires less processing resources when used. At this point, more resources can be allocated to learning the new information. As a result, once older adults have learned how to use preadjunct questions, they may be able to devote more cognitive processing resources to the to-be-learned material, and hence demonstrate better performance on recall tests.

Thus, as Anstey and Freebody's (1987) findings with children suggest that training in how to use preadjunct questions as a learning strategy may well facilitate learning, and hence memory performance on recall tests, for older adults.

In addition to researching the effect of training on preadjunct effectiveness, it would be useful to replicate studies in which prose text has been used, substituting older adults for college students as participants. In this manner, one could identify whether or not preadjunct questions help older adults learn prose text as has been demonstrated with college students. This study could be carried further, by including both young and older adults in the research design to compare developmental differences. However, in such a study, particular attention must be paid to variables that might work against the performance of older adults. For instance, if the criterion test requires long, detailed answers, older adults may perform more poorly as compared to young adults simply because they may be slower in writing down their answers.

As well as comparing the performance of young and older adults in preadjunct question studies, it would be useful to study the effectiveness of preadjunct questions for older people from different ethnic backgrounds and/or for those whose first language is not English. Society is becoming increasingly culturally diverse. People from other cultures and countries have very different life experiences as compared to the mainstream in North

America, including how they have experienced learning and education. These experiences will have an impact on how they learn in the classroom. Consequently, preadjunct questions may produce different effects for these older adults.

There are some difficulties in conducting research with older adults. Identifying older adults in an educational setting is difficult. Most school boards do not have educational programs specifically for seniors, and it is not possible to single out older adults in registration lists. However, most communities have many senior citizen groups which may be approached to find participants.

Another difficulty in conducting research with older adults is to convince them to participate. To obtain participants for this study, approximately 100 classes with approximately 20 people in each were attended over a period of two weeks to explain the study. The drawing card for this particular study was its subject of high blood pressure. Participants in the study came to see the video. Taking part in the study was secondary. Without exception, participants commented on the excellence of the video used in this study. They thought the subject was highly relevant and informative, and that video itself was expertly produced. Thus, research would require an interesting topic, one that would appeal to older adults, so that they would be willing to participate in the study.

A further difficulty in studies of this nature involves choosing a topic that is not only interesting to people, but also one about which people have very little prior knowledge. Ideally, people would possess no prior knowledge about the topic. However, no prior knowledge about a topic may also indicate little interest in the subject and confound the research with motivational variables.

In summary, several interesting avenues exist for further research on preadjunct questions. Future directions might include replicating this study involving adults from different age groups and cultural backgrounds, substituting prose text as the instructional material for older adults, as well as examining the effects of training on preadjunct question use for older adults.

Implications for Practice

The results of this study suggest that educators who teach older adults must not assume that teaching strategies that work with young adults will necessarily work for older adults. This study has demonstrated that preadjunct questions, which were an effective strategy to help college students learn from prose text, did not help older adults learn from a video. It has been suggested that deficits in the processing aspects of working memory are the underlying cause of this finding. This explanation is based on the findings of both Craik et al. (1989) and Salthouse (1988). However,

under certain conditions, preadjunct questions may be quite effective as a learning strategy for older adults. This reasoning is supported by studies which have shown that older adults' performance can be improved by explicit instructions (Ratner et al., 1988) and training (Schaie & Willis, 1986). Hence, educators may find preadjunct questions an effective teaching strategy if they first explain the purpose of these questions to older adult learners, instruct them in how to use the questions, and then provide opportunities for practice. Once using the strategy becomes automatic through repeated practice, older adults should have more cognitive processing resources to devote to the to-be-learned material. Thus, combined with training and practice, preadjunct questions may be an effective strategy for older adults. Until further research provides more evidence on the effectiveness of preadjunct questions, educators are advised to build opportunities for training and practice in their use into their teaching plans.

Conclusions

Studies with college students indicate that preadjunct questions are an effective teaching strategy. This study has demonstrated that preadjunct questions did not help older adults learn information about high blood pressure from a video. The findings were explained in terms of an age-related deficit in the cognitive processing resources of working memory.

In addition to involving older adults as participants rather than college students, it was emphasized that this study differs from the typical preadjunct question in two essential ways; that is, in its use of video rather than prose text as the learning material, and in its naturalistic rather than laboratory setting. It was suggested that this difference in methodology may have contributed to the results. Further research is necessary on preadjunct questions, not only to explore their usefulness for older adults, but also to investigate their effectiveness with instructional material other than prose text, as well as their practical usefulness in the classroom setting. In the meantime, educators should use preadjunct questions as a teaching strategy only after instructing older adult learners in their use and providing practice opportunities.

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Appendix A

PREADJUNCT QUESTIONS AS A LEARNING STRATEGY FOR OLDER ADULTS

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You are being asked to participate in a study designed to find out how to increase the amount of information older adults (55 to 70 years of age) learn from a videotape on high blood pressure. You will be assigned to one of two groups. One group will receive some questions before they watch the video, while the other group will not be given the questions. After viewing the video, you will be asked to write down some answers to questions based on information in the video. As well, you will be asked to return one week later to write down your answers again. Your time commitment will be approximately one and one-half hours the first day and one-half hour the second day.

I am hoping to learn from the study how well questions given before a videotape help people to learn. If questions provided in this manner prove to be effective in increasing learning, they may be an important teaching strategy for educators to use.

If you have any serious uncorrected hearing or vision difficulties, consider carefully whether or not they will interfere with watching or listening to the video. Take this into account when you decide whether or not to participate in the study.

This study is not connected with any course offered by the college. You are free to refuse to participate or to withdraw from the study at any time without penalty. Your identity will remain confidential. Information on you will be retained by me and used for research purposes only.

The study will take place in October, 1992. I will contact you to let you know the date, time and place. If you have any questions, please phone me at one of the above numbers.

Sincerely,

Barbara Smith, R.N., B.Sc.

PLEASE TURN OVER

PLEASE COMPLETE THE SECTION BELOW IF YOU AGREE TO PARTICIPATE

Yes, I will participate in the study. I understand that I am free to withdraw from this study at anytime without penalty. I understand that my identity will remain confidential. As well, I understand that this study is not connected with any college course.

_____
Signature

Name: _____
please print

Address: _____
Street Apt. No.

_____
City

_____
Postal Code

Phone Number: _____

The time at which I prefer to be phoned is _____

THANK YOU VERY MUCH. YOUR PARTICIPATION IS GREATLY APPRECIATED

Appendix B

Questions about High Blood Pressure

1. How would you explain what blood pressure is?

2. Why should people be concerned about high blood pressure?

3. What things might a person have that puts them at risk for developing high blood pressure?

4. What might a person do to reduce the chances of getting high blood pressure?

5. How is high blood pressure treated?

YOUR NAME IS_____

Appendix C

High Blood Pressure and Harry

Harry is a salesman for a small manufacturing company. He is 55 years old, married with two children in university. In his job he travels a lot out of town, and consequently, he is often away from home for several days at a time.

Harry finds that most of his sales are made while entertaining customers over dinner and drinks. Over the last several years he has gained quite a lot of weight and now weighs over 220 lbs. He blames this weight gain on his frequent dining out.

Harry has been feeling tired lately. He has had to drive himself harder and work long hours to make a decent commission. This added stress has resulted in him smoking and drinking more.

Harry's father had high blood pressure for years. Harry's wife worries that he might take after his father. Lately she has been nagging him to have a physical exam. Now he is sitting in his family physician's office waiting for a check-up.

Questions About Harry

1. If you were Harry's doctor, how would explain to him what high blood pressure is?

2. Why should Harry be concerned about high blood pressure?

3. What risk factors has Harry got for high blood pressure?

4. What might Harry do to reduce his chances of getting high blood pressure?

5. If Harry has high blood pressure, how can it be treated?

YOUR NAME IS_____

Appendix D

High Blood Pressure and Alice

Alice is 63 years old and lives with her son and his family. She came to live with them five years ago after her husband died. Shortly after settling in with her son, Alice got a part-time job at a bakery shop. One of the perks of her job is that she gets free pastries for her coffee breaks.

As well as working at the bakery shop, Alice helps out at home by doing all the cooking and baking. She likes highly seasoned food and uses salt liberally in her cooking. She particularly likes sitting down to a platter of bacon, eggs and homefries in the morning.

Alice's love of food and cooking has resulted in her being quite overweight. However, as she states, she has always been heavy, and her weight does not slow her down or cause her any problems.

Alice freely admits that she is a television addict. Once the supper dishes are done, she settles herself in front of the television, not moving until bedtime. Besides watching television,she loves to read mystery stories and knit for her grandchildren. Once or twice a week she phones her sister to see how she is getting along after her heart triple bi-pass surgery.

Today, Alice went to her family doctor for her annual check-up. Her doctor told her that she is a good candidate for getting high blood pressure.

Questions About Alice

1. If you were Alice's doctor, how would you explain to her what high blood pressure is?

2. Why should Alice be concerned about her blood pressure?

3. What risk factors has Alice got for high blood pressure?

4. What might Alice do to reduce her chances of getting high blood pressure?

5. If Alice gets high blood pressure, how can it be treated?

YOUR NAME IS_____

Appendix E

NAME_____

QUESTIONNAIRE

To help make the results of my study more meaningful, please complete the following questions.

What is your date of birth? _____

What is your occupation? _____

If you are retired, what was your occupation before retirement?

_____

What is your highest level of education? Please check your highest level.

Grade school _____

High school _____

Community College _____

University: Baccelaurate ____ Masters ____ PhD ____

What language are you most comfortable using? _____

Do you wish to receive the results of the study?

Yes _____

No _____

THANK YOU VERY MUCH.
YOUR PARTICIPATION IS GREATLY APPRECIATED

Appendix F

Marking Scheme

Note: One point is given for each statement listed below.

Question #1

How would you explain what blood pressure is?

- force/pressure that blood exerts against wall of blood vessels, resistance to flow

(if the above correct, then points for the following)

- purpose of circulation - delivery of oxygen and nutrients to vital organs

- description of circulation of blood throughout body
- smaller the blood vessel, more resistance to blood flow, more pressure created

- BP determined by amount of resistance/size of openings
- BP determined by speed and force of heart beat
- BP determined by volume of blood circulating in body

- automatically regulated to meet body's needs/ normal fluctuations, changes to meet body's demands, rest versus activity
- example of normal fluctuation
- definition of systolic reading
- definition of diastolic reading

- high BP=BP that consistently stays at high levels, 140/90
- "white coat hypertension" fear of doctor leads to increase in BP

- causes unknown, know contributory factors
- example of contributory factor

- primary/essential hypertension
- secondary hypertension, specific cause which can be treated

- levels of hypertension -mild, moderate, severe
- mild - diastolic is 90 - 104
- moderate - diastolic is 105 - 114
- severe - diastolic is above 115

Question #2

Why should people be concerned about high blood pressure?

- high BP can have serious consequences on person's life, shorten life, cause death, decrease quality of life, trigger physically damaging problems

- can feel perfectly normal, unaware anything is wrong, silent killer

- leading cause of stroke, heart disease

- stroke
- because BV becomes blocked completely or weakened and bursts

- heart attack
- BV becomes blocked

- enlarged heart
- because heart has to work harder
- leads to heart failure/abnormalities in heart rhythm

- kidney failure
- because high BP damages BV's that lead to kidneys
- narrowed arteries lead to more hormone production which in turn raises BP

- eye disease/retinopathy/loss of sight
- tiny vessels in retina haemorrhage

- Mechanism of how BV's damaged, leading to atherosclerosis (hardening of the arteries). Constant elevated force of blood pounding against arterial walls causes damage to vessels. They weaken, lose their flexibility, begin to thicken. High BP and high cholesterol together accelerate formation of fatty plaques along linings of arteries.

- Second explanation- BP damages the cells that line the arteries so that blood fats go into the cracks between the cells.

Question #3

What things might put a person at risk for developing high blood pressure?

- older age

- male/female after menopause

- heredity, family history

- race, black

- obesity, fatty food, high cholesterol

- salt sensitivity

- alcohol, drug abuse

- smoking

- stress

- sedentary life style, lack of exercise

- pregnancy

- contraceptives

- example/reason/explanation for a risk factor - each example = 1 point

Question #4

What might a person do to reduce the chances of getting high blood pressure?

- early detection, regular BP checks, consult MD

- become informed, be aware of risk factors, take control

- decrease alcohol intake
- do not drink daily, no more than three drinks daily

- decrease, stop smoking

- restrict amount of saturated fats/cholesterol in diet
- substitute fish, chicken
- avoid sweets

- lower salt intake, 1/2 tsp daily/ use other spices

- avoid processed meat, canned goods
- eat fresh foods especially fruits and vegetables
- fresh foods have increased potassium which may help to lower BP

- reduce diet, eat less, reduce weight

- get exercise
- aerobic or isotonic moving exercises
- eg. walking, jogging, tennis, swimming
- 1/2 hour a day, three times a week
- avoid tension building exercises, lifting weights

- reduce stress
- relaxation techniques, meditation techniques, 5-10 minutes a day
- exercise good for reducing stress
- substitute relaxation techniques for smoking

Question #5

How is high blood pressure treated?

- life style changes as above
- any life style change not mentioned above

- medication
- medication for BP consistently over 140\90

- point each for naming type of medication - diuretics, beta blockers, alpha blockers, ACE inhibitors, vasodilators, calcium channel blockers

- work by regulating one of three factors - blood volume, heart rate, vessel resistance
- diuretics - volume reducers, promote excretion of salt and water
- beta blockers - slow heart rate, prevent heart from beating too forcefully
- alpha blockers, ACE inhibitors, vasodilators and Calcium channel blockers
- resistance reducers, keep blood vessels open, allowing blood to flow with less resistance
- alpha blockers decrease cholesterol levels

- start with drugs to make blood flow better
- eg. of last point -alpha blocker, ACE inhibitor, Calcium channel blockers

- report side effects stat
- description of side effect, diuretics increase cholesterol, decrease potassium, increase blood sugar, beta blockers may cause fatigue, slow cardiac output

- take medication regularly
- do not discontinue medication without consulting physician, stay on prescribed regime

- be informed, ask questions, take control, plan appropriate therapy with physician

- regular checks, know your BP

Appendix G

Transcription of Audio Portion of Video: Say Goodbye to High Blood Pressure

Leslie Charlson: Hello, I'm Leslie Charlson. You may know me as Dr. Monica Quartermain on General Hospital. It's very likely that we have something in common. For years I have played the leading role of a cardiologist on television. Each day after hours of videotaping, my acting is over. Chances are you are an actor too. The difference is that you are always in character. You know you have high blood pressure, but you act as if nothing is wrong.

Since there is usually no symptoms of high blood pressure, you don't feel vulnerable and think any treatment makes you feel worse than your problem.

But, continuing to act this way can prove to be deadly.

Untreated high blood pressure is the leading cause of stroke and heart disease.

On television, if you suffer a stroke or heart attack, all it is that will happen is that you are written out of the script. In the real world it is not pretend, it is not make-believe. You really do suffer. But it doesn't need to be that way.

In the next half hour we will learn to how to say good-bye to high blood pressure. Say good bye to the risks. You will realize that taking care of yourself is the best role that you can ever have.

Narrator: With the first ring of a fire alarm bell, hearts are pumping, adrenalin is flowing, and the pressure is on. These firemen are geared up and ready to go.

Such bursts of energy temporarily raise the blood pressure and are natural and healthy reactions.

But imagine a state where your blood pressure is always elevated, always pounding throughout your body, as if you are constantly racing to a fire.

This is what happens when you have high blood pressure, a complex disease whose causes are not entirely understood.

Physician: In truth, most of the high blood pressure, 98% of high blood pressure in America, we call essential hypertension.

We don't know why people's blood pressure goes up.

We know these contributing factors, too much salt, overweight, some of those things, but we really don't know the basic mechanism.

Narrator: To begin understanding this disease, let's review the basic facts about blood pressure and what it means.

Everyone has blood pressure.

Without it your blood would not circulate through the body, feeding oxygen and other essential nutrients to vital organs.

The process begins with your heart.

With every heartbeat, your blood is pumped into the body's major artery, the aorta.

From there it flows into smaller and smaller arteries that extend throughout your body.

Your blood as it travels through this intricate network, exerts force against the walls of the blood vessels.

This force is called blood pressure.

As the vessels become smaller, resistance to blood flow increases and more pressure is created, much like tightening a nozzle on a garden hose.

The amount of this resistance, combined with the speed and force of heart beat and volume of blood circulating through the body determine blood pressure.

In the healthy person, these three variables, heart rate, blood volume and resistance are automatically regulated to keep your blood pressure within a safe range while providing for your body's needs.

Physician: So really, blood pressure is a combination of how hard the blood gets pushed out, what is called cardiac output, and the resistance, the openings of the blood vessels, how easy do they let the blood flow through.

Narrator: During the course of the day, blood pressure will change to meet the demands of the body.

When you are active, it goes up. When you are relaxed, it comes down.

These are normal fluctuations and are no cause for concern.

Many people even experience large short term jumps in blood pressure, 30 to 40 points, as a result of work, stress and exercise.

In fact, during maximum aerobic exercise, some people can even reach 240/120, but this very high level is only momentary.

However, in some people, like Ray Federley, blood pressure remains at a consistently higher level.

What is particularly troublesome is that Ray, like many others with high blood pressure, felt perfectly healthy, unaware that anything was wrong.

Ray: High blood pressure is often referred to as the silent killer.

The reason is that people don't always realize that they have high blood pressure.

I didn't realize that I had high blood pressure when I was diagnosed. I didn't find out until I went to the doctor for something else.

Physician: When they don't feel bad, you think everything is fine when it isn't.

Blood pressure is sneaky. By the time you don't feel fine, it is almost too late.

You are starting to have your stroke.

If you develop high blood pressure in you mid-30s, if left untreated, you could live 20 years less than someone who is normal or treats their hypertension.

Do you really want to throw away 20 years of your life, or learn to manage your high blood pressure? Why lose what are often some of the best years of your life?

That's why it is necessary for you to check for hypertension through regular blood pressure measurements and if it is found that you do have high blood pressure, to then stay on your treatment.

You may feel fine, but inside your body, elevate blood pressure is triggering problems that are not only physically damaging but life threatening as well.

It almost cost Charles Large, his life, as he rescued a man from a burning building.

Charles: I found him lying on the kitchen floor, very heavy. I tried to lift him but couldn't. I had to drag him outside the building. By the time I got him outside my heart was racing a mile a minute. I was gasping for breath, and my ears were ringing. They checked my blood pressure and found out it was 210/120 and I was sent to see the doctor right away. He said that the amount of damage that was done showed them that there had been two silent heart attacks and that I was extremely lucky to be alive.

Narrator: Charlie was thankful to be alive, but his life had now changed forever. When the doctor told him his fire fighting days were over, it came as an unexpected slap in the face.

Charles: I was totally shocked and numb. Fire fighting had been my life. I had loved the job, and suddenly to realize it was over was almost devastating.

Narrator: Charlie is like all of us who tend to downplay the potential risk factors - a little overweight, cigarette smoking, and stress, well that is what a fireman's life is all about.

These can all lead to dangerous consequences of hypertension.

Charles: I firmly believe that my high blood pressure led up to problems with my heart and I have been told by doctors and other medical personnel that was the basic cause of what happened to me.

Narrator: Like an engine that is raced to fast for too long, high blood pressure wears out the whole cardiovascular system.

The constant elevated force of blood pounding against the arterial walls causes damage to the vessels.

They weaken, losing their flexibility and begin to thicken.

This leads to a condition called atherosclerosis or hardening of the arteries.

Here high blood pressure and high cholesterol levels work together to accelerate the formation of fatty plaques along the linings of the arteries.

Physician: What's happening is that your getting these cholesterol deposits in your artery and its building up and blocking the blood flow, and the higher the pressure, the more that gets pushed into your artery.

We thought of that as one mechanism.

Another mechanism is that the blood pressure can damage the cells that line the arteries so that blood fats will even go into the cracks between the cells.

Narrator: Like a time bomb ticking away in you body your vessels can eventually narrow or block to a point where they inhibit blood flow making it difficult for oxygen and other nutrients to reach your vital organs.

If a cerebral vessel which lead s to your brain becomes completely blocked or is so weakened it bursts, you suffer a stroke.

And when a coronary vessel which leads to your heart is blocked it causes a heart attack.

High blood pressure also makes your heart work harder in an effort to force the blood though the narrow damaged vessels.

This strain can lead to an dangerously enlarged heart.

And an enlarged heart has trouble pumping efficiently leading to heart failure or abnormalities in the heart rhythm.

Charles: They found out that I had an irregular heart beat. I had an enlarged left ventricle that was badly scarred. I had ischemia, a lack of sufficient blood to the heart under stress. I had unstable angina. I was a borderline diabetic, and of course, the blood pressure was extremely high.

Narrator: High blood pressure not only wreaks havoc on your cardiovascular system, it also damages the blood vessels that supply the kidneys.

This can eventually lead to kidney failure.

When the kidneys go, barring a kidney transplant your are talking about a life on a dialysis machine, and who would have thought by neglecting to treat your hypertension in the first place that you would now rely for survival on a machine.

This, unfortunately, is what happened to Lettie Howell.

Her hypertension remained undetected for years, until she developed symptoms of nausea and fatigue, common with kidney failure.

By then it was too late.

Physician: In the kidneys when that starts to shrink, a vicious cycle sets in, that the narrowing and tightness in the arteries leads to a hormonal production in the kidneys that are bad for you, that are tending to raise the blood pressure.

Narrator: Another severe chronic side effect of high blood pressure is called retinopathy or eye disease.

After prolonged untreated high blood pressure, the tiny fragile vessels of the retina haemorrhage.

In fact, doctors often use the eyes as a good diagnostic indicator of the extent of vascular damage throughout the body.

Physician: The only place in the body where we can actually see those blood vessels and observe them is when I look in the back of the eye.

I can actually see them running in the back of your eye through the clear part of your eye.

I can see their walls thickening up and I can see them getting tortuous.

I can even see where they have broken and their little haemorrhages and little deposits.

Narrator: With early detection and proper treatment all of these consequences of high blood pressure are preventable.

If you don't already know what your blood pressure is, make a commitment to find out.

Measuring your blood pressure is a painless procedure involving a device called the sphygmomanometer.

A sphygmomanometer expresses your blood pressure in two numbers, the systolic and diastolic measurements.

The systolic reading measures your blood pressure at it highest point, when your heart contracts, pumping blood into your arteries.

The diastolic measurement is your pressure when your heart is relaxed, letting blood flow back in.

A blood pressure reading of 120/80 means your systolic pressure is 120 and your diastolic is 80.

Blood pressure readings consistently above 140/90 are considered hypertensive.

Physician: You have got to know your number.

You have got to make sure it stays under 140/90.

If someone takes your blood pressure, you should be very anxious to know, right after they take it, you should be asking that number.

You should make them give you that number.

You are the keeper.

Narrator: If your blood pressure measurement is high, your doctor will probably want to check you a few more times just to make sure.

Physician: We take several readings, about 5 or 10 minutes apart, let you sit quietly, so that were really sure that that's what you have.

Because we have found that people that get so frightened by the doctor their blood pressure goes up really high from that, and that's been called "white coat" hypertension.

Narrator: The next time you go to the doctor, maximize you chances of getting an accurate reading.

Avoid smoking, eating, or drinking caffeine prior to you check-up.

If it is chilly outside, bundle up.

Cold temperatures cause muscle tension which may raise your pressure.

Also, relieve your bladder before the test.

A full bladder often elevates readings.

Finally, sit quietly and relax at least 5 minutes before your pressure is taken.

Once the doctor or nurse has measured your blood pressure and he suspects you have hypertension, the next step is a physical exam.

Physician: The physical exam usually looks at the eyes to see if there is any damage, to see if the heart is enlarged, to have any evidence of any king of circulatory problems.

And then we do a few simple laboratory tests.

Usually a single blood test is obtained and we can measure the amount of potassium and sodium in the blood, kidney function, the amount of sugar in the blood.

These are the sorts of things that should be fairly much routine for anybody with an elevated blood pressure.

Narrator: If your hypertension is suspected of having an underlying cause, further testing may be needed.

Physician" For a few people there is a specific, what we call secondary cause, something wrong with the kidney, the blood flow to the kidney, abnormal disturbance.

These are most of the kinds of what we call secondary hypertension.

Narrator: If you are someone who has secondary hypertension, treatment of the underlying cause often with surgery, will usually result in your blood pressure returning to normal.

Most of you though, have what is called essential hypertension.

Physician: 95 out of 100 people, we really do not know why the hypertension, the elevated blood pressure occurs.

We call that essential, I think probably a better term is primary hypertension, which simply means, we have no logical explanation.

Narrator: Essential hypertension is divided into three levels, mild, moderate, and severe.

If you have mild hypertension, your diastolic reading ranges from 90 to 104.

If you have moderate hypertension, you have a reading somewhere between 105 and 114.

And if your hypertension is severe, your diastolic reading is consistently over 115.

Physician: It's very dangerous if that lower number is 115 or higher.

That almost a medical emergency.

Narrator: Ruby Ford's blood pressure was at this dangerously high level and she, as if often the case, had no warning signs.

Ruby: One time I was very ill, it was 240 over 180. I didn't know I was that ill. I wasn't dizzy. I wasn't nervous.

Narrator: While doctors don't know precisely why someone like Ruby can have such severe hypertension, they are able to identify nine major risk factors associated with the disease.

Heredity, race, age, sex., obesity, salt sensitivity, alcohol and drug abuse, stress and a sedentary life style.

For Ruby, heredity played an important part.

Ruby: My mother died from a stroke. She had high blood pressure. I have some sisters with high blood pressure and a brother with high blood pressure.

Physician: What it is that people inherit from their family we don't know.

But we do know that if you have a hypertensive parent, a mother or father, youv'e got about a twice a chance, a two-fold increased likelihood, of developing high blood pressure.

Narrator: Ruby's family history was not the only risk factor working against her.

Her race was a variable as well.

African Americans tend to develop high blood pressure twice as often as Caucasians.

Physician: The reason that blacks have more hypertension we don't really quite know.

We know what goes on.

They develop more kidney damage.

They have more strokes.

But why it is they have more hypertension is probably hereditary.

There is also some evidence that the diet may be a factor.

Narrator: Age and sex are also significant variables associated with high blood pressure.

While less than 3% of all children in America have the problem, a gradual rise in pressure is often seen with advancing age.

Risk levels between men and women also change as you grow older.

Physician: Men tend to have a bit more, a greater likelihood of having high blood pressure, but after the menopause, women begin to develop more and more high blood pressure, and overall, if you look at all ages, they are about equal between the two sexes.

Narrator: Obesity is another known risk factor.

It's just not the extra pounds that are the problem.

It's where you carry them.

Excess fat in the abdomen and chest is more often associated with hypertension than lower body obesity that is located mainly in the hips and thighs.

Physician: There is a lot of good evidence that if you carry your extra weight in the middle and upper part of your body, which is unfortunately the way that most American men going through middle age do, and that extra weight appears to be a problem relative to the development of high blood pressure.

Narrator: To find out if you have excess body fat, divide your waist measurement by you hip measurement.

If the number is greater than .85 then you are at risk.

Physician: I think it is very important to measure your waist to know that if you are beginning to put on that middle aged spread that is a problem even if you don't have a whole lot of extra pounds.

Narrator: Fortunately, weight is one of the risk factors you can do something about.

But remember, it is not possible to spot reduce your upper body fat.

You can only lower your overall weight.

A good way to start on the road to shedding these extra pounds is to restrict the amount of saturated fat in your diet.

Physician: Since the high cholesterol and high blood pressure work together to cause a lot of the vascular trouble then it is very smart for someone whose got an elevated blood pressure to also do what they can to lower their cholesterol and that means cut out the saturated fats, substitute fish and chicken for the foods that have got a lot of saturated fats in them.

Charles: Now when I go into a restaurant I look for broiled fish. I stay away from fatty foods, sweets. It's quite possible for me to get foods that are prepared for people who have high blood pressure or heart problems, or who are watching their cholesterol intake.

Narrator: This means paying attention to your salt intake as well.

Too much salt can contribute to high blood pressure especially if you salt-sensitive.

While our bodies actually need a certain amount of salt to survive we consume far more than what's required.

One-half teaspoon of salt in our daily diet is all we need, and yet, most Americans eat 4 times this amount.

Physician: The best advice I think is , since you don't need it and since there is a fairly good background of evidence that it can be a problem, is to avoid at least high levels of salt intake.

Charles: I do restrict the use of salt in my diet, There are all different kinds of spices that you can use in place of salt, prepared spices that you can buy at the grocery store that give the food ample flavour.

Ruby: Lemon is marvellous. Because once you start using lemon, you really don't miss salt.

Narrator: Avoid processed meat and canned goods that are loaded with salt and replace them with fresh foods, especially fruits and vegetables.

Not only will you lower the amount of sodium you consume, but you will increase the potassium in your diet which may help in controlling your blood pressure.

Physician: Potassium is a very common part of almost all natural foods.

Unfortunately, when foods are processed some of the potassium is leached out and extra sodium or salt is added in.

I think is much better to go back to nature because we know that we have evolved over millions of years in a very high potassium, low sodium diet.

Narrator: Now there are other minerals such as Calcium and Magnesium which some people believe might lower high blood pressure, but today there is no conclusive evidence substantiating that claim.

This holds true for the fatty acids found in fish as well.

Physician: I think that the best evidence is that it does not really affect the blood pressure.

I think however on the other hand, eating extra amounts of fish is a good way of lowering the amount of saturated fats in the diet.

Narrator: All of these do's and don'ts might be confusing so to start you on the path to eating right you might want to use this daily diet as a guide.

...(visual of diet).

What you drink is as important as what you eat.

Having a beer, a glass of wine, a cool martini, is one thing, but drinking too much alcohol on a daily basis, can cause your blood pressure to rise to dangerous levels.

Physician: It doesn't take that much alcohol to raise the blood pressure.

It has been estimated that 1 out of 10 American men who have high blood pressure have it as a result of excess alcohol intake, by excess, anything beyond 3 drinks a day.

Narrator: And, as most of you couch potatoes are painfully aware, a lack of exercise, better known as a sedentary life style, is a risk factor as well.

Charles: I'm a typical couch potato. when I'm sitting 5 feet from my television, I have 3 controls to control the TV, the VCR, and the stereo. You just don't have to get up any more to do anything.

Narrator: To get yourself off that couch and into a healthier, more active way of life, you need to find an exercise routine you not only enjoy but helps you control your blood pressure.

Physician: As far as exercise is concerned, it is very important to do aerobic or isotonic, moving exercises. Nothing better than walking, jogging, tennis, swimming.

On the other hand, those exercises that cause a lot of tension to the bulk of the muscle, body building. While you're doing those exercises, your blood pressure can go up, sometimes to very high levels.

Narrator: So, if you have very high blood pressure, leave the barbells alone and do aerobic exercises one-half hour a day three times a week.

If you get into a regular routine of exercise, you can lower your resting blood pressure about 10 diastolic points.

Ruby: After I go to the gym, I fell a million times better. I do things differently. I feel better. I don't be as tired as I used to be. I'm not so short of breath like I used to be.

Narrator: Exercise not only helps keeps you slim, its effective in relieving stress as well.

Study after study has associated stress with a variety of diseases, including high blood pressure.

Anyone who has experienced that irritating morning ritual, the commute, knows it only too well.

Physician: We, as humans, possess a response called the fight or flight response.

When in a stressful circumstance, our blood pressures increase, our heart rates increase, our metabolism increases and it is believed that these transient elevations in blood pressure with stress, with time, are translated into more or less permanent elevations in blood pressure.

Narrator: To help you reduce the stress in your daily life there are some simple relaxation techniques that for some, are effective in lowering blood pressure.

Such techniques, when done for only 5 or 10 minutes a day, lower blood pressure as much as 10 points.

Physician: People using very simple meditative techniques for example, where you would sit quietly, close your eyes, pay attention to your breathing and have a repetitive word, sound, prayer, or thought come to mind at predictable, reproducible, measurable changes. In other words, by simply changing your thinking pattern there were profound changes in, for example, the overall metabolism of the body.

Narrator: Relaxation techniques are a way of positively counteracting stress.

They are simple and easy to do.

Use them to replace all the negative ways you have of coping with stress.

If you smoke to relax, try one of these techniques instead.

Smoking cigarettes is a danger to your health that is radically compounded if you have high blood pressure.

Physician: There is a very likelihood of developing complications mainly of the heart, if you are a smoker and also have high blood pressure because smoking is the major factor responsible for heart attacks.

Narrator: For women, there are a select number of risk factors that you should be aware of.

If you're pregnant, your blood pressure will usually decline in the first six months, but then may rise in the last few months by 15 diastolic points or more.

There is also a known risk for women who are taking the pill. One in 20 women who take contraceptives experience a blood pressure rise within 5 years.

If you are at risk or already know you have hypertension, losing a little weight, exercising a bit, cutting down on salt and learning to take a few moments to relax, are all good ways to control your blood pressure.

But sometimes these life style changes alone are not enough.

If your blood pressure stays consistently above 140/90, medication is often necessary.

Today there are a number of drugs now available.

The most common are diuretics, beta blockers, alpha blockers, angiotensin converting enzymes, or ACE inhibitors, vasodilators and calcium channel blockers.

Since your blood pressure is regulated by your blood volume, heart rate, and vessel resistance, all of these drugs work by influencing one of these three factors.

Diuretics are volume reducers. They promote the excretion of salt and water from the body.

Beta blockers slow the heart rate and prevent the heart from beating too forcefully.

Alpha blockers, ACE inhibiters, vasodilators and calcium channel blockers are resistance reducers.

They work through a variety of methods to keep blood vessels wide open, allowing blood to flow with less resistance.

Physician: In the past, the overwhelming majority of American physicians have generally followed what we call a step-care approach, which means that you start with one drug as your first step, and if that does not do it, you add a second drug as a second step. And if that doesn't do it, you add a third, and you keep going up.

Narrator: Traditionally, diuretics have been the first step, followed by beta blockers. And they remain the most widely used medications for high blood pressure.

The problem is for some, these drugs may produce undesirable side effects.

Physician: It turns out with diuretics there are also a number of side effects which can for some people be a real problem.

It can raise the cholesterol in the blood.

It can lower the potassium level in the blood.

It can raise the blood sugar.

So a diuretic, although it may be very effective, and be a very good drug for many people, may also be a problem for some others.

Narrator: For Ray, beta blockers were not the best choice of treatment.

They made him feel fatigued and worn out even before the day began.

Ray: "I'd take it in the morning and by the time I got to work I was ready to go back to bed. It was that bad.

Physician: A lot of the medicines we used, that diuretic, that beta blocker, that really slowed the cardiac output. That was not such a good idea. I don't really want to lower your cardiac output, because if I take that out of you, you are going to lose the uumph, the spirit in your life.

So, I think we are going to see a big shift now in American medicine where we are going to start with drugs that make the blood flow better.

Narrator: The introduction of these resistance reducing drugs, alpha blockers, ACE inhibitors and calcium channel blockers have given physicians more choices.

Not only are they showing promising results, they seem to exhibit fewer unwanted side effects.

And with alpha blockers you can actually have an added benefit.

Physician: Among the types of newer drugs that we got, the alpha blockers may actually improve the cholesterol levels.

It may lower the cholesterol level.

Physician: Doctors now look upon the whole spectrum of drugs available, and take into consideration the severity of your hypertension, your physical condition and the potential side effects of the drugs.

They then structure a therapy that fits your individual needs.

Physician: This is where doctor/patient communication is crucial.

If someone has a problem with the medication they are taking, whether it affects their libido or makes them drowsy, they should immediately go back to their doctor.

Physician: "Have you had any side effects form your medicine?"

Patient: "I've had a dry cough of and on at night and I'm concerned."

Narrator: If you're experiencing too many side effects or the medication is not effectively lowering your blood pressure, your physician can adjust the dosage, or try another drug, or combination of drugs.

Physician: So I think we are going to try a different prescription for you.

Anybody put on medication today, should ask the doctor, what it is, why they are taking it and what it will do for them. There is no reason why they can't get a proper answer today.

Narrator: Once all your questions are answered and you an your doctor have chosen an appropriate therapy, stick with it.

Failure to take medication is one of the main problems in controlling high blood pressure.

Ray: If anyone's having trouble taking it they can do like I do. I have a little box which has Monday, Tuesday, Wednesday, Thursday, Friday on it. I put all my pills that I have to take that day in that little box, and then I flip that lid up, and take the pills out with my juice, and it is done.

Ruby: I try to set it by the clock so when I look at the clock, I see the time because I get forgetful sometime, but I'm supposed to take it everyday at nine o' clock.

Physician: I advise people to take their medication regularly at the same time that they brush their teeth or they eat their breakfast or do something else that is a regular part of their life routine.

Narrator: Whatever you do, never stop your therapy without consulting your doctor first.

Physician: When you stop the medicine you will creep right back up to those blood pressures, and you will be in trouble.

So it's one of those things that you are either doing to protect yourself or you are not going to do it and you are going on to get the stroke.

Ruby: So the best way to protect yourself is to do what you are supposed to do, because no one's going to die but you. No one's going to be ill but you.

Ray: High blood pressure is nothing to fool with and it is nothing to ignore.

Narrator: When it comes to high blood pressure, you can't go through the motions of treatment.

You must take control.

Stay on your medication.

Make it a part of your routine along with a few simple life style changes.

Remember, high blood pressure is a lifelong disease but not a life long burden.

But a personal commitment and the help of your doctor, you can learn to say goodbye to the problems of high blood pressure and lead a long and healthy life.